Exploring the impact of retail design on shopping behaviour: using the built shopping environment to examine the relative effect of motivational orientation.

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Exploring the Impact of Retail Design on Shopping Behaviour: Using the Built Shopping Environment to Examine the Relative Effect of Motivational Orientation

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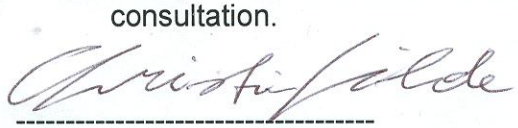

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ABSTRACT

Retail design is an important but not very widely researched area in atmospherics. Therefore, this thesis explores the effect of retail design on shopping behaviour, using a cognitive and affective information-processing route. Based on the Kaplan (1987) environmental preference framework, the thesis model examines the cognitive path by refining the traditional Kaplan (1987) structure by adding, in part, service quality. The affective path is studied using the approach-avoidance model by Kaltechva and Weitz (2006) in light of motivational shopping orientation. Overall, the retail design cues of shelf height, aisle width, and floor pattern are posited to have an impact on consumers' cognitive and affective environmental evaluations (repeat patronage intentions).

A 2x2x2x2, between-subjects (factors: shopping orientation, shelf height, aisle width, floor pattern) laboratory experimental design was employed to test the hypotheses developed from the theoretical framework. Dependent measures included legibility, tangible service quality, arousal, pleasantness, and repeat patronage intention. For the cognitive path, the environmental preference combined with the tangible service quality segments of the model were tested. For the affective path, the arousal and pleasantness parts of the model were tested. The research consisted of two similarly designed studies, with study two aiming to replicate the results of study one with a different, more controllable manipulation approach. For study one, expert-selected pictures of store environments and for study two computer-generated shopping environments were used to enable the necessary environmental manipulations.

The results for both studies partially supported the model. Shelf height and floor pattern had a significant impact on repeat patronage intention for the cognitive but not affective path. Furthermore, shopping orientation moderated neither the effect of legibility on tangible service quality (cognitive path) nor the effect of arousal on pleasantness (affective path).

Also, the results showed that tangible service quality mediated the effect of legibility on repeat patronage intention.

Parts of this Thesis have been Included in the Proceedings of EMAC and ANZMAC

CHAPTER I
INTRODUCTION

1.1 Why Study Retail Design?

More specifically, what is the benefit of retail design to different stakeholders, such as retail practitioners, researchers, and customers? After thorough study of the atmospherics literature, a number of reasons emerged which can be, for instance, assigned to the stakeholder category of practitioners. Retail practitioners are eager to design environments that elicit certain behaviours, such as customer approach, excitement, spending time, buying, and repeat purchasing. Practitioners that are concerned with the management side of marketing aspire to understand how to use space, interior design, colour, lighting, and materials to create environments that engage and attract buyers. They also want to react to the challenges of global E-commerce and create retail spaces that deliver a supremely physical shopping experience that no virtual environment can match.

Another stakeholder group that has interest in retail design is researchers. Researchers are mostly interested in creating and testing theories in the area of atmospherics and finding controllable and reliable methodologies to test these theories. They are also interested in exploring the meaning of the built environment by looking at the environment-behaviour relationship from an environmental as well as behavioural perspective. Furthermore, they want to expand the environmental-emotional approach applied by psychology to other, unexplored areas.

Another and certainly the most important stakeholder group that is affected by retail design is the customers. Customers want to easily locate products, find their way through a retail setting, and satisfy their shopping needs by having an enjoyable shopping experience. In addition, customers create an identity through consumption and the places where they shop. Customers

want to approach, explore, communicate and perform/buy in these retail spaces (a store which is aided by retail design).

1.2 Nature of the Problem

> Planning and design [of space] on all scales (...) can be seen as the organization of space for different purposes and according to different rules, which reflect the activities, values, and purposes of the individuals or groups doing the organizing.
>
> Amos Rapoport (1982),
> *The Meaning of the Built Environment*

The influence of atmospherics, which is an attempt to design buying environments to produce specific emotional states in the buyer that enhance the likelihood to purchase (Kotler 1973), on shopping behaviour is widely recognised by academic experts, practitioners and in the retailing literature (Baker, Grewal, & Levy 1992; Bitner, 1992; Donovan & Rossiter, 1982; Kotler, 1973; Martineau, 1958; Turley & Milliman, 2000). For instance, Brynes (2000) and Turley and Milliman (2002) reported that Toys R Us, a specialty store chain for toys, spent between $200,000 to $800,000 per store to redesign each retail location. Also, recent interest in this subject area was demonstrated by research studies that were published in the *Journal of Marketing* (Kaltcheva & Weitz, 2006), *Journal of Consumer Behaviour* (Parsons & Conroy, 2006), and *Journal of Marketing Management* (Turley & Chebat, 2002). Unfortunately, most of our knowledge and understanding about this topic is limited and based on anecdotal evidence (e.g., Berman & Evans, 1995; Levy & Weitz, 2007) and insufficient theory. In addition, rigorous academic research has been hampered (Turley & Milliman, 2000) due to methodological shortcomings and a lack of the necessary operational and financial resources. Whilst the

body of knowledge provides basic insights about the effect of atmospherics on buyer behaviour, a number of gaps remain in our understanding related to this area and more detailed research is needed to explain how store design impacts consumer behaviour.

Although there are a few theories with direct relevance to the subject, the most widely used is the environmental-response framework proposed by Mehrabian and Russell (1974). The common consensus in the research community (Baker, Grewal, & Levy, 1992; Donovan & Rossiter, 1982; Turley & Milliman, 2000) is that this particular approach is useful for explaining the effect of atmospherics on purchase behaviour. The Mehrabian-Russell (MR) framework is built on the premise that particular environmental stimuli cause shoppers to react to (evaluate) the information presented through the stimuli and, then, based on these reactions (evaluations), favourably or unfavourably respond to these stimuli. This same psychological model can be applied to explain the relationship between store design and buyer behaviour (Baker, Grewal, & Levy 1992; Donovan & Rossiter, 1982; Sherman, Mathur, & Smith, 1997).

When taking a closer look at the literary, theoretical, and methodological grounding of this store design-buyer behaviour relationship, five shortcomings are evident: (1) The applicable literature consists of only a few useful studies that have been published over the years that can be employed to explain this relationship; (2) Most of the findings in this area are based on experiential evidence or proprietary research that is rarely made public; (3) Many behaviour results can only be predicted rather than actually demonstrated; (4) Only a few theories appear to be applicable to atmospherics, and many of them are based on a MR-like approach; (5) The research community has limited knowledge to tell which are efficient stimuli to trigger certain behavioural outcomes. Thus, atmospherics falls short of producing a good classification system that identifies these stimuli.

Therefore, this research seeks to find out whether the chosen design factors of shelf height, aisle width, and floor pattern impact shopping behaviour, and (considering other theory in addition to a Mehrabian-Russell-like approach) how environmental preferences shape the design-behaviour relationship. The aforementioned issues invite more rigorous scientific inquiry and give rise to the challenging research question that follows in Section 1.4.

1.3 Positioning and Significance of the Research

This section explores the positioning and significance of this thesis research. The beginning of this section briefly reflects on my epistemological worldview. Having defined my general research vision, I introduce my area of inquiry and present a suitable quantitative method to explore my topic of interest. Laboratory experimental design, which creates a positive research strand, is the quantitative method of my choice. By introducing this systematic and controllable methodology, its suitability to investigate my area of inquiry is examined. Concluding this section is a discussion of the significance of my research.

Since this research is informed by a positive science tradition, it attempts to push scientific inquiry forward by logically deducing from theory and embracing the replicability of this research. Seeking to uncover cause and effect relationships, statements such as "the true representation of the population is needed" (Malec, 2005), "structured and systematic research design is essential" (Gray, 2005), and "theory and hypotheses drive data collection" (Gray, 2005) are key to this research. The position of theory to research in this approach is viewed through a deductive lens. If properly magnified, ideally generalizable inferences can be drawn from observations and replication is the outcome of this research (Bryman & Bell, 2003). While experiments are often criticised for exhibiting low external validity, high internal validity of the approach makes it an effective choice of research design for the testing of causal inferences. Accordingly, my

epistemological stance (acceptable knowledge) is to seek an explanation of human shopping behaviour in a positivist notion, which links cause and effect relationships. I am therefore less focused on emphasising an "understanding of human behavior", which would be more in line with an interpretive tradition (Bryman & Bell, 2003). One way to expose these cause-effect relationships is through laboratory experiments (Donovan & Rossiter, 1982). However, it has to be mentioned that deduction and positivism can contain inductive and interpretive elements and vice versa (Bryman & Bell, 2003).

This thesis research explored the effect of retail design on shopping behaviour, using a cognitive and affective information processing route. Based on the Kaplan (1987) environmental preference framework, the thesis model examined the cognitive path by refining the traditional Kaplan framework and by adding, in part, customer service. The affective path was studied using the approach-avoidance model designed by Mehrabian and Russell (1974) and adopted by Kaltechva and Weitz (2006) with consideration of motivational shopping orientation. Overall, the retail design cues of shelf height, aisle width, and floor pattern were posited to have an impact on consumers' cognitive and affective environmental evaluations and, thus, whether consumers repeatedly approach a retail establishment. Two studies based on laboratory experimental design were employed to test the hypotheses developed from the theoretical framework. The framework's independent, mediating, moderating, and dependent measures were examined by using the appropriate statistics. The two studies differed with respect to their methodology, with one study employing pictures and the second study utilising virtual environments to enable the necessary environmental manipulations and control for external factors.

As far as the significance of the given research is concerned, a brief explanation is provided in this section. However, a more focused discussion of this research's significance follows in chapter two, section

2.3, which investigates why atmospherics and, in this context, retail design are studied.

In general, environmental psychology (a) studies the consequences of existing behaviour, (b) suggests solutions for existing behaviour and its problems and (c) predicts behaviour (DeYoung, 1999). Reflecting on the first area, which addresses the consequences of existing behaviour in natural or built environments, touches on an entire host of issues. The natural environment and its ecological decay have been cause for great concern for decades. The social problems emerging in built environments, such as homelessness or crime, are important environmental psychology research topics (Bell, 1996). The second area, which attempts to suggest solutions for existing behaviour and its problems, is an especially prevalent issue when, for instance, examining defective learning environments. Identification of and proper response to such academic problems can be very beneficial to students and teachers (Gray, 2005). The third major contribution that environmental psychology can make to our state of knowledge involves predicting behaviour. In this respect, predicting customer behaviour in a business sense is particularly lucrative. But besides attempting to build environments that stimulate purchases (Wakefield & Baker, 1998), one could, for example, also study the irritants that make shopping for customers an unpleasant experience (D'Astous, 2000; Sherman, Mathur, & Smith, 1997). Furthermore, environmental psychology calls for the active participation of customers to help plan and manage these environments and, ultimately, create sustainable shopping conditions for themselves. These examples are only a small cross-section of the reasons why atmospherics/environmental psychology is significant to this line of investigation and, in this respect, should be studied.

In summary, employing laboratory experimentation to research the impact of retail design on shopping behaviour is an appropriate design choice, allowing the research to be conducted in a structured and controlled manner to provide useful insight into the area of atmospherics.

1.4 The Research Question

Even though we know, to a certain extent, that retail design cues influence consumer behavior, too little research has been conducted regarding which design stimuli are relevant and how they affect shopping behavior. Thus, the following overarching research question has been advanced, which helped to frame this thesis research:

> Are the retail design cues of shelf height, aisle width, and floor pattern important determinants of shopping behaviour?

The research question concerns itself with the design factors that actually have an impact on consumer behaviour. The thesis research posits that the design cues of shelf height, aisle width, and floor pattern influence customer response behaviour.

In this respect, Markin (1976) defines the retail environment as a "bundle of cues" which "affect and shape consumer behavior" (p. 43). Included in this bundle of cues are atmospheric stimuli that are disparate in nature. Baker, Grewal, and Levy (1992) organised these cues into three distinct categories for their research, which relate to the social factor, the ambience, and the design of a store environment. It is the last, the design factor, that this thesis research is concerned with. In this context, many studies (Baker, Grewal, & Levy 1992; Bitner, 1992; Donovan & Rossiter, 1982; Kotler, 1973; Martineau, 1958; Turley & Milliman, 2000) have recognised the importance of design stimuli in shopping environments. However, only a few undertook rigorous research regarding their impact on consumer behaviour, focusing mainly on factors such as signage and merchandise placement and neglecting to consider shelf height, aisle width, and (to a certain extent) floor pattern. Mehrabian and Russell (1974) report that there has been "an increasing concern with the effects of architecture and interior design on individual and social behavior" (p.4). The

Donovan (1982) and Baker (1992) studies reiterate the importance of retail design as a salient component of the retail equation.

Thus, with the ambient factor (Areni & Kim, 1993; Cameron , Baker, Peterson, & Braunsberger, 2001; Milliman, 1982; Yalch & Spangenberg, 1990) and social factor (Baker, Grewal, & Parasuraman, 1994; Bitner, Blooms, & Tetreault 1990; Parasuraman, Zeithaml, & Berry, 1985) already studied and some tangential investigations into the influence of the design factor, the design element leaves room for further investigation. Because of the important role the design factor plays in shopping environments, it is necessary to seek further clarification as to which design factors impact shopping behaviour and advance the aforementioned research question.

1.5 Aims of the Study

The previous sections provide information on the research problem and research position of this work, information which is important for formulating the aims of this study. The overarching purpose of this thesis research is to investigate the impact of store design on shopping behaviour (intention to behave), more specifically on repeat patronage intention and tangible service quality perception. Thus, to determine how design factors affect arousal and pleasantness, environmental preferences, and shopping behaviour the following research aims have been developed:

1. To explore which design factors (shelf height, aisle width, floor pattern) have an impact on shopping behaviour within retail environments; and in particular, what effect these design factors have on purchase behaviour (repeat patronage intention).
2. To assess whether a more complete stimulus taxonomy can be developed, once the effects of the chosen design factors have been tested and studied.
3. To provide new research evidence for whether shopping orientation moderates the effects of arousal on pleasantness.

4. To examine how tangible service quality impacts the relationship between retail design cues and shopping behaviour.
5. To ascertain whether elements of the Kaplan environmental framework can be extended to physical retail environments, with consideration of service quality.
6. To determine the appropriateness of the environmental preferences, service quality theory, and Mehrabian-Russell approach for the investigation of design factors in context of the proposed framework.

1.6 Thesis Organisation

This thesis consists of six chapters. Chapter 1 introduced the nature of the research problem and the significance, aims, and research question that can be derived from this problem. Chapter 2 provides background information on atmospherics, environmental psychology, and shopping motivation and, at the same time, creates an understanding for the theory that drives this research effort. This is followed by Chapter 3, which concerns itself with the framework proposed for this research. Building on this Chapter is Chapter 4, which talks about the methodology employed for this effort. Chapter 5 presents the results and analyses the findings of the studies. Concluding this thesis is Chapter 6 with an examination of the general results, the limitations of the studies, the research and managerial implications, and future opportunities that might arise from this research.

1.7 Definition of Key Terms

Approach-Avoidance: Approach-avoidance responses have four different dimensions: "(1) The desire to physically stay or leave an environment; (2) The urge to explore or not explore the setting; (3) The willingness to communicate or not communicate in an environment; and (4) The desire of enhanced or decreased performance in a space" (Donovan & Rossiter 1974, p. 37).

Arousal: Arousal "is a state of how wide awake the organism is.... The lower pole of the continuum is represented by sleep or coma, while the upper pole would be reached in states of frantic excitement" (Berlyne, 1960, p. 48).

Atmospherics: Atmospherics is an "effort to design buying environments to produce specific emotional states in the buyer that enhance the purchase probability" (Kotler, 1974, p. 50)

Computer-Aided Design/CAD: Computer-Aided Design is using a computer as a tool in designing objects that range from automobiles to store environments to computer chips by providing an interactive drawing tool and an interface to simulation and analysis tools for the engineer (Encyclopædia Britannica, 2009). This computer design technique typically was (in the past) the domain of architects, engineers, and professional designers, due to the expense, steep learning curve, and complexity of CAD software.

Environmental Psychology: "Environmental psychology is the study of molar relationships between behaviour and experience and the built and natural environments" (Bell et al., 1996, p. 6).

Floor Pattern: Are the space design and allocation, work station placement, placement of equipment, placement of cash registers, waiting areas and waiting rooms, department locations, racks and cases, furniture, and dead areas in a store (Berman & Evans, 1995).

Interior Design: Interior design is to find a creative solution for a programmed interior (intentionally built environment) (American Society of Interior Designers, 2006).

Legibility: Legibility is a psychological construct and defined as "the ease with which its [an environment's] part can be can be

recognized...organized into a coherent pattern" (Lynch, 1960, p.2). Weisman (1981) views legibility as an important component that supports the process of wayfinding. Passini (1984) associates the legibility of an environment with how simple it is to extract information from a setting and comprehend the setting.

Motivation: Motivation can be envisioned "as the mechanism governing movement from one state to another.... [Simon] postulates that consumers develop a set of goals which are to be achieved by progressing from the initial state toward the consummation of the choice" (Simon 1967, as cited in Bettman, 1979, p.44).

Motivational Orientation: Motivational orientation is the shopping predisposition with which buyers engage in purchasing. These motives that influence shopping can be either pleasurable or economic in nature (Bellenger & Korgaonkar, 1980).

Pleasantness: Is the average level of pleasure measured by a group of raters in a particular environment (Mehrabian & Russell, 1974). This will, to a large extent, depend on the nature and scope of the stimulus that triggers the response. Mehrabian and Russell (1974) equate the affective dimension of pleasantness with a "feeling state" (p. 18) that can manifest itself through behaviour, such as smiling and laughter.

Repeat Patronage Intention: Is defined as a high likelihood of shopping and shopping more frequently at a particular store (Wakefield & Baker, 1998). In the same vein, Zeithaml, Berry, and Parasuraman (1996) define repeat patronage intentions as preferring one store over the other, repeatedly purchasing from a store, and doing more business with a particular retail establishment in the future.

Recreational Orientation: The shopping activity is "freely chosen" and allows the buyer to "derive inherent satisfaction from the shopping activity itself" (Kaltechva & Weitz, 2006, p.109).

Tangible Service Quality: Tangible service quality perceptions are the functional, visually appealing, and up-to-date physical aspects of a retail store whose appearance is in line with the type of service provided (Parasuraman, Zeithaml, & Berry, 1988).

Task-Oriented Orientation: "Shopping out of necessity to obtain needed products, services, or information with little or no inherent satisfaction derived from the shopping activity itself" (Kaltechva & Weitz, 2006, p. 109).

CHAPTER II
RELEVANT LITERATURE

2.1 Introduction

This chapter discusses the literature and theories relevant to this study. First, atmospherics, the primary focus of this research, is presented in the context of what in a retail atmosphere stimulates consumers, how the atmosphere of a store is evaluated by consumers, and how consumers respond to it. This discussion is enriched by reviewing the extant research in atmospherics and how retail design informs this research. Second, the literature and theories important to environmental psychology are presented, with special attention to the Mehrabian-Russell model and Kaplan framework. And finally, this is followed by an in-depth look at motivation as related to shopping orientation; more specifically, as related to shopping orientation as a moderator, research on shopping orientation, and the different types of shopping orientation. This literature and theory are then combined into a model, which is presented in Chapter III.

2.2 Atmospherics

2.2.1 Defining Atmospherics

> Appearance means a great deal in advertising. At the agencies (...) décor is a means of expression; the agency tries to say something about itself by its space, color, and design. At Young & Rubicam (...) the spaces are large, the upholstery material is leather and the color is green—wall, carpets, chairs and couches are green....A visitor to the executive floor of Y&R could be pardoned the feeling that he was in a bank; a long spacious, deeply carpeted hall (...) the monochrome green enforcing an impression of solidity.
>
> Martin Mayer (1959),
> *Madison Avenue, U.S.A.*

Looks matter! This is especially true for this particular advertising agency, which attempts to convey an image of solidity and business-like professionalism through its interior design. In this case, the agency's atmospheric design is used to entice the customer. Yet, whether the environmental setting is luxurious as in the case of Young & Rubicum or Spartan-like as in a Walmart or Home Depot (Levy & Weitz, 2007), these purposefully created environments are intended to influence the consumer.

The influence of strategically built retail environments on shopping behaviour (atmospherics) is widely recognised by academic experts, practitioners, and in the retailing literature (Babin & Darden, 1995; Baker, Grewal, & Levy, 1992; Bitner, 1992; Donovan & Rossiter, 1982; Kotler, 1973; Markin, Lillis, & Narayana, 1976; Martineau, 1958; Turley & Milliman,

2000). Recent interest in this subject area was demonstrated by research studies that were published in the *Journal of Marketing* (Kaltcheva & Weitz, 2006), *Journal of Consumer Behaviour* (Parsons & Conroy, 2006), and *Journal of Marketing Management* (Turley & Chebat, 2002). For instance, Kaltechva and Weitz (2006) found that shopping orientation moderates the effect generated by a store environment on the pleasantness of the store environment. Parsons and Conroy's (2006) research suggested that, for many e-tailers, the use of sensory stimuli in the creation of a store atmosphere in an online context only partially matches consumers' desires. Turely and Chabet (2002) concluded that a retail atmosphere is an important strategic tool in linking retail strategies and atmospheric design with consumer behaviour. Yet, most of our understanding about this topic is limited and based on anecdotal evidence and insufficient theory. In addition, rigorous academic research has been hampered (Turley & Milliman, 2000) due to methodological shortcomings and a lack of the necessary operational and financial resources. Although the existing research provides basic knowledge about the effect of atmospherics on buyer behaviour a more detailed study of this area is needed to explain this design-behaviour relationship (Turley & Milliman, 2000).

Kotler (1973) defined atmospherics as the "effort to design buying environments to produce specific emotional states in the buyer that enhance the purchase probability" (p. 50). Kotler (1973) went on to say that the atmosphere of a retail setting is a medium whose "colors, sounds, and textures (...) may directly arouse reactions that contribute favourable to purchase probability" (p. 54). To make this area of retailing more accessible, Kotler (1973) furnished his definition of atmospherics with vivid examples from different industries, such as the case of Francis C. Rooney, a shoe executive, who "has redefined shoes from utilitarian to a pleasure concept" and with it the shopping experience for these items. "The atmosphere [of Rooney's stores] is designed to give the buyer the feeling of being rich, important, special..." (p. 55). Another example is the airline industry. Kotler (1973) reported that confidence in flying—one vital factor

for purchasing this product—is built by a number of elements, among which are the following architectural components: (a) An air terminal that is modern, with restaurants and shops that are attractive; (b) The airplanes exterior and interior design is sturdy and attractive. Along those lines, Markin (1976) defines the retail environment as a "bundle of cues" which "affect and shape consumer behavior" (p. 43). Included in this bundle of cues are atmospheric stimuli that are various in nature. Thus, naturally the following questions arise: What makes an atmosphere (stimulus)? And subsequently: how is this atmosphere evaluated by consumers (organism)? And what shopping behaviours are the outcome (response) of these evaluations?—questions that are addressed in the next three sections and in more detail discussed in from of the Stimulus-Organism-Response Model in section 2.3.2.

What makes an atmosphere?

Baker et al. (1992) organised atmospheric cues, which are suggested to influence shopping behaviour, into three distinct categories. These categories relate to the social factor, the ambience, and the design of a store environment. Ambient factors are mostly concerned with music, climate, and lighting. Social factors are the environmental conditions created by employees, customers and their interactions. Design dimensions, the subject of this research, address the architecture, layout, and other planned physical features of the environment. Compared to Baker et al. (1992), Bitner (1992) developed an alternative set of stimulus dimensions when she undertook her study on servicescapes. She studied different types of service organisations through a framework that examines the effects of physical surroundings on customer and employee behaviour. The framework proposes that environmental dimensions (stimuli), such as ambient conditions, space, function, signs, symbols, and artifacts, facilitate the achievement of marketing goals. Bitner specifically mentioned customer attraction, exploring, spending money, returning, and carrying out a plan as goals that can be influenced by physical surroundings. Based on Berman and Evans' (1995) categorization of atmospheric stimuli, Turley and

Milliman (2000) suggested an even more refined taxonomy of elements that are said to have an impact on shopping behaviour and which incorporates exterior, general interior, store layout, interior display, and human variables. However, many of these variables are derived from anecdotal accounts and retail textbooks and have not been researched yet (including aisle width). Table 2.1 displays the variables presented by Turley and Milliman (2000):

Table 2.1 Table of Atmospheric Variables

External Variables	General Interior Variables	Layout and Design Variables	Point-of-Purchase Variables	Human Variables
Exterior signs	Flooring and carpeting	Space design and allocation	POP displays	Employee characteristics
Entrances	Color schemes	Placement of merchandise	Signs and cards	Employee uniforms
Exterior display windows	Lighting	Grouping of merchandise	Wall decorations	Crowding
Height of building	Music	Work station placement	Degrees and certificates	Customer characteristics
Size of building	P.A. usage	Placement of equipment	Pictures	Privacy
Color of building	Scents	Placement of cash registers	Artwork	Artwork
Surrounding stores	Tobacco smoke	Waiting areas	Product displays	Product displays
Lawns and gardens	Width of aisles	Waiting rooms	Usage instructions	Usage instructions
Address and location	Wall composition	Department locations	Price displays	Price displays
Architectural style	Paint and wall paper	Traffic flow	Teletext	Teletext
Surrounding area	Ceiling composition	Racks and cases		
Parking availability	Merchandise	Waiting cues		
Congestion and traffic	Temperature	Furniture		
Exterior walls	Cleanliness	Dead areas		

Source: Turley and Milliman (2000, p.194)

It is the design factor that this thesis research is concerned with. After thorough review of the applicable literature, width of aisles, shelf height, and space design and allocation (floor pattern) emerged as promising features to be researched (Levy & Weitz, 2001; Titus & Everett, 1995; Vrechopoulos et al., 2004), features that define the dimensions and arrangement of retail space. How these environmental elements are evaluated/processed by consumers, is the subject of the next section.

Evaluations of Consumers

One of the primary approaches that consumer researchers and psychologists use to explain the topic of consumer internal evaluations of an environment is the cognitive-affective distinction. Mehrabian and Russell (1974), Kaplan (1982), Zeithaml et al. (1988), and Bagozzi et al. (2002), amongst others, employed this distinction of internal states (cognitive/affective) that are induced by the physical environment.

This research uses, as discussed in later chapters, two paths of information evaluation: cognitive and affective. Honderich (1995) defines cognitive evaluations as "the domain of representational states and processes...involved in thinking...using language, guiding and controlling behavior" (p. 138). These are to be distinguished from affective evaluations which are, according to Bagozzi et al. (2002), related to "sensations, feelings or emotions" (p. 37). These two environment-induced paths affect shopping behaviour somewhat differently (Baker et al., 1992; Mehrabian & Russell, 1974). Befittingly, Hoch and Loewenstein (1991) and Shiv and Fedorikhin (1999) call this distinction between the affective and the cognitive a distinction between the desire and the willpower, and a distinction between the heart and the mind.

Cognitive evaluation of an environment is a more high-level psychological activity. Baron and Byrne (2004) refer to this kind of evaluation as "ways in which we process, store, remember, and use" (p. 103) information. Berkowitz (1993) equates cognitive information evaluations with processes such as "appraisals, interpretations, schemas, attributions, and strategies" (p. 12). The perception of an environment can be, according to S. Kaplan (1973) and Shiv and Fedorikhin (1999), a psychological activity which involves the conversion of sensory stimuli (e.g., environmental cues) into meaningful information. In other words, this conversion can be a cognitive activity. Kaplan (1973) refers to this process in relation to building cognitive maps (information guides) as "making sense" (p. 279) of the environment,

such as finding your way (legibility) in a particular environment. In this context, various research studies support the view that environmental cues in a retail environment influence the shoppers' cognitive processes. For instance, Baker, Grewal, and Parasurman (1994) found that shoppers associate a higher quality in merchandise and service with a store environment that possesses a prestige-image (ambiance) and vice versa. In this context, the authors discovered that merchandise and service quality mediate (at the cognitive level) the effect of ambience of an environment on responses to certain types of store image. At this level respondents assign "meaning" (Baker et al., 1994, p.108) to certain stimulus-response connections. Baker et al. (2002) developed a conceptual framework, which integrates cognitive and environmental psychology and which is used to assess a retail outlet on the basis of environmental perceptions. This model is grounded in Zeithaml's (1988) work on value perception and advances that store environmental cues can influence service quality, price and merchandise value (Baker et al., 2002).

Compared to cognitive evaluations, affective environmental evaluations are much more superficial, involving emotions and feelings, or as Berkowitz (1993) phrases it "relatively basic and automatic associative processes" (p. 10). Eysenck (2000) refers to affective processing as evaluation that covers a "wide variety of experiences, such as emotions and moods" (p. 489). In this respect, numerous studies (Babin & Darden, 1996; Baker, Grewal, & Levy, 1992; Donovan et al., 1994; Hui & Bateson, 1991; Wakefield & Blodgett, 1999) produce evidence that suggests that store environments cause affective reactions in consumers. For example, Hui and Bateson (1991) found that, in the context of the service experience, perceived control mediated the effect of consumer density and choice on pleasantness and the consumer's approach-avoidance responses. Another study discovered that badly designed store environments may decrease shopping pleasure and lead to the decline of customers' moods (Spies, Hesse, & Loesch, 1997). In general, the affective side of retail design is much more researched (e.g., this thesis attempts to link shelf height/aisle

width/floor pattern with arousal and pleasantness and shopping behaviour) than the cognitive side, which provides a good opportunity for this thesis research to add to existing cognitive knowledge in atmospherics.

Once evaluated/processed, environmental information can lead to different shopping responses (outcomes), and those relevant to this research are discussed in the section on shopping behaviour (intentions to behave).

Shopping Behaviour (Intentions to Behave)

Donovan and Rossiter (1982, 1994) advance that shopping behaviour can manifest itself in the desire to physically stay or leave, explore or not explore, and perform in or not perform in an environment. Berman and Evans (1995) identify, amongst others, enjoyment, internal store feature examination, information acquisition, purchasing, and satisfaction as possible shopping behaviours. Turely and Milliman (2000) suggest that the most widely described behaviours in this literature stream are approach behaviour and time spent in the environment. In this thesis repeat patronage intention and tangible service quality are the intentions of shopping behaviours that were investigated. These constructs are particularly useful in representing outcome variables, since previous research by Babkus and Boller (1992) and Baker et al. (2002) has shown that both can relatively easy reflect behavioural intentions. Kaltechva and Weitz (2006) were able to link arousal with purchase intentions part of which are repeat patronage intentions, a relationship which is mediated by pleasantness. The following discussion takes a closer look at these outcome variables.

Repeat Patronage Intentions

Repeat patronage intentions and their relationships with other variables, such as customer satisfaction, have been researched and documented in the literature (Bloemer & Kasper, 1995; Cronin & Taylor, 1992; Fornell, 1992; Yu & Dean, 2001). Zeithaml et al. (1996) define repeat patronage intentions as preferring one store over the other, repeatedly purchasing

from a store, and doing more business with a particular retail establishment in the future.

Sometimes, repeat patronage behaviour is mentioned in the same breath as store loyalty. Sheth, Mittal, and Newman (1999) define store loyalty as "a customer's predominant patronage of a store based on a favorable attitude" (p. 721). This kind of behaviour is expressed by a consumer visiting a store more than other stores to acquire a particular type of merchandise and having a more favourable attitude toward the sales establishment compared to other stores. Furthermore, Sheth et al. (1999) state that store loyalty is greatly impacted by how favourable the shopping experience is, which can depend on ease of merchandise selection, in-store information, convenience, problem resolution, and personalization.

However, Bloemer and Ruyter (1998) state that a distinction should be made between store loyalty and repeat visiting behaviour. Bloemer and Ruyter (1998) argue that store loyalty could be thought of as "pledging or binding of a customer to a particular store" (p. 500). They equate repeat store visiting with the actual revisiting of the store whereas store loyalty is kind of a deeper commitment to a store. In this sense, Wakefield and Baker (1998) equate repeat patronage intentions with a high likelihood of shopping and shopping more frequently at a particular store, which is along the lines of Zeithaml's et al. (1996) approach to repeat patronage intentions. Fitting with the research of Kaltechva and Weitz (2006), this thesis used Wakefield and Baker's (1998) conceptualization of repeat patronage intentions.

Tangible Service Quality Perception

Service quality is the consumer's judgement about an entity's overall excellence or superiority (Zeithaml, 1987). Parasuraman, Zeithaml, and Berry (1988) view service quality as evolving around a comparative relationship between what the customer expects and what the service provider performs. Veas (1995) advances that a good is produced,

whereas a service is performed and closely related to the person/entity that performs it; a relationship that can provide an indication for the quality of the service delivered. Thus, service quality is a comparison of the excellence of the different service encounters experienced by customers (Cronin & Taylor, 1992). Parasuraman, Zeithaml, and Berry (1988) define service quality for the SERVQUAL instrument as follows: "The construct of quality as conceptualized in the services literature and as measured by SERVQUAL (...) is the consumer's judgment about an entity's overall excellence or superiority... it is a form of attitude, related but not equivalent to satisfaction, and results from a comparison of expectations with perceptions of performance" (p. 15).

However, one has to further distinguish between the different dimensions the SERVQUAL scale and, thus, service quality possesses. The scale is composed of five dimensions of service quality properties: tangibility, reliability, responsiveness, assurance, and empathy. It is the first dimension, tangible service quality, this thesis focuses on because of the retail design emphasis of this research and unexplored nature of this dimension. Tangible service quality perceptions (Parasuraman, Zeithaml, & Berry, 1988), which are used in this context as a dependent measure, are the functional, visually appealing, and up-to-date physical aspects of a retail store whose appearance is in line with the type of service provided. These tangible aspects can be related to, for example, modern-looking equipment and fixtures, neatness, and attractiveness of a store environment.

2.2.2 Research in Atmospherics

Currently, the retail industry relies primarily on anecdotal and proprietary evidence (e.g., Berman & Evans, 1995; Levy and Weitz, 2007) and insufficient theoretical support (Turley & Milliman, 2000) to explain what and how design elements affect consumer behaviour. Sophisticated

academic research has been limited due to theoretical challenges, methodological shortcomings, and a lack of the necessary operational and financial resources.

To review the atmospherics research that has been conducted to date, one must start with the initial stimulus-organism-response research undertaken by Mehrabian and Russell (1974). Mehrabian and Russell (1974) report that there had been "an increasing concern with the effects of architecture and interior design on individual and social behavior in normal populations" (p. 4).

Building on the work of Mehrabian and Russell (1974), Donovan and Rossiter, with their 1982 study, made a significant contribution to help establish atmospherics as a part of marketing and environmental psychology. In their study, Donovan and Rossiter chose different store environments as their research venues. The authors tested whether information rate and the emotional states of pleasure, arousal, and dominance allow researchers to predict approach and avoidance behaviour of consumers. They found that in pleasant store environments shopping-related intentions, such as shopping enjoyment and time spent browsing, increased with an increased level of arousal. However, it seemed as if dominance had only a small impact on approach-avoidance behaviour, and most responses to store environments could be explained by pleasure and arousal only.

In 1992, Baker, Grewal, and Levy took the Mehrabian-Russell (1974) model, refined by Donovan and Rossiter (1982), and expanded this framework. Baker, et al. found that, while Donovan and Rossiter did a great service to marketing by introducing this model to retailing, the authors' adaptation focused only on the relationship between pleasure and arousal and its behavioural outcomes (approach-avoidance). Donovan and Rossiter (1982) vastly ignored the stimulus area. To make up for this shortcoming, Baker and her co-researchers added ambient, social, and

design factors as stimulus cues. However, while Baker, et al. (1992) found that "ambient cues interact with social cues to influence respondents' pleasure and the social cues influence arousal in the store environment" and "these affective states (pleasure and arousal) are in turn found to have a positive relationship with respondents' willingness to buy" (pp. 1-2), they still neglected to subject the design factor to a closer examination due to the anticipation of weak results.

Over the years, research in atmospherics, especially as related to the design factor, has led to interesting findings. Weisman (1981) and O'Neil (1984) stressed that navigational performance can be improved by simplifying floor layout. Weisman (1979) indicated that an individual locates a specified destination much better in buildings that are clearly architecturally differentiated. A similar study conducted by Sommer and Aiken (1982) confirms that problems with recalling the location of various product categories are related to poor aisle layout and a lack of visual cues. Iyer (1989) and Park, et al. (1989) examined the effect of wayfinding (store knowledge) within time constraints on purchase behaviour. The results showed that unplanned purchases are more likely to take place under circumstances in which shoppers had store knowledge but not time constraints (Iyer, 1989). In the same context, Richardson, Jain, and Dick (1996) contended that aesthetically pleasing stores with a good layout of aisles were more attractive to customers and supported the sale of local brands.

Ward and Eaton (1994) investigated whether decorative style and quality function are a cue for how competent retail service providers are. They found that different styles of environments influence the assignment of blame for service failure. Other studies (Curhan, 1974; Gagnon and Osterhaus, 1985; Wilkinson et al., 1982) found that prominent displays can significantly affect sales. Gagnon and Osterhaus (1985) discovered in their research that point-of-purchase displays noticeably increase sales.

McElroy, et al. (1990) suggest that most of the visitors to an office display favourable feelings and attributions toward an office environment that is tidy. Pinto and Leonidas (1994) compared patient attitudes towards an old and new doctor's office. They found that satisfaction with the new facility was higher; satisfaction, however, did not greatly impact the perception of the overall service quality. These findings (cautiously) support the proposition advanced by Hutton and Richardson (1995) that organised and tidy environments are more likely to lead to satisfaction than disorganised facilities.

Twenty years after Mehrabian and Russell (1974) and Donovan and Rossiter (1982), Turley and Milliman (2000) were still not able to report on more than sixty useful research pieces that have been produced in the realm of experimental atmospheric design. Due to the dramatic expansion of the World Wide Web over the past 15 years, the atmospherics research reported by Turley and Milliman (2000) and others shifted its focus from physical stores to online stores. Until then, relatively few studies had focused their attention on the E-tailing spectrum (selected studies that have paid closer attention to E-tailing since then are as follows: Childers et al., 2001; Eroglu, Machleit, & Davis 2003; Heijden, 2004; Fiore, Jin, & Kim 2005; Griffith, Krampf & Palmer 2001; Koufaris et al., 2001/2002; Lohse & Spiller, 1999; Valacich et al., 2007; Wu, 1999;). And, even most of the recent studies in this field conclude that there is an urgent need to expand the existing knowledge and theory and foster more exploration in this research-neglected area.

2.2.3 What is Retail Design?

Bitner (1992) defines retail design as creating an environment for a specific purpose using the "spatial layout and functionality of the physical surroundings" (p. 66). For instance, Zellers stores debuted with a prototype store that featured uncommonly wide aisles, improved line-of-sight, and aisle-layout that functioned as in-store divisions. This distinct store planning

allegedly doubled the sales compared to standard Zeller outlets (Duff, 1999). In the same vein, high ceilings (16-foot ceilings) were one of the elements that were incorporated in the revamped Atlanta Fish Market, a reconstruction that cost approximately $4.5 million. This feature, among others, was credited with having increased the Market's sales from $3.5 million in 1993 to $6 million in 1994 (Zuber, 1996).

The retail industry spends millions of dollars every year to plan, design, and remodel store interiors (Baker, Grewal, & Levy 1992). Unfortunately, our understanding of the impact of store design on consumers is limited and an exact definition of retail design (store planning) is hard to come by. Therefore, one has to refer to the definitions provided by the *American Society of Interior Designers* and the *U.S. Bureau of Labor Statistics*. The *American Society of Interior Designers* (2006) describes interior design as finding a creative solution for a programmed interior (built environment), whereas the *U.S. Bureau of Labor Statistics* (2006) sees interior design as an aesthetic and practical effort, which is conducive to an intended purpose, such as raising productivity, selling merchandise, or improving lifestyle. In other words, retail design is the conscious planning of interior space or, in the given case, the strategic designing of shopping environments to create customer satisfaction.

Markin (1976) defines the retail environment as a "bundle of cues" which "affect and shape consumer behavior" (p. 43). Included in this bundle of cues are atmospheric stimuli that are various in nature. Baker, Grewal, and Levy (1992) organised these cues into three distinct categories for their research, which relate to the social, the ambient, and the design of a store environment. It is the last, the design factor this thesis research is concerned with. Even a few studies (e.g., Baker et al., 1992; Donovan & Rossiter, 1982; Kaletchva & Weitz, 2006) have recognised the importance of design stimuli in shopping environments. However, many of them fall short of undertaking rigorous research on the impact of these stimuli on consumer behaviour.

The following are some of the retail design factors that have been mentioned in the literature (Baker, 1983; Bitner, 1990; Berman & Evans, 1995; Turley & Milliman, 2000) as possible influencers on shopping behaviour:

- Flooring and carpeting
- Colour schemes
- Lighting
- Width of aisles
- Wall composition
- Paint and wall paper
- Ceiling composition
- Merchandise
- Space design and allocation
- Placement of merchandise
- Grouping of merchandise
- Work station placement
- Placement of equipment
- Placement of cash registers
- Department locations
- Traffic flow
- Racks and cases
- Furniture
- Dead areas
- Point-of-purchase displays
- Signs and cards
- Wall decorations
- Degrees and certificates
- Pictures
- Artwork
- Product displays
- Usage instructions
- Price displays
- Teletext

The next section provides a detailed discussion of the retail design cues this thesis employs in its research design as independent measures. In this respect, shelf height, aisle width, and floor pattern have not been researched or were under-researched in the past and yet these design factors can define the dimensions of retail space (height-length-width).

Retail Design Cues

Taking a closer look at the previously listed retail design factors, this thesis effort built on the given research and more closely examined the variables of shelf height, aisle width, and floor pattern.

The independent measures of aisle width and shelf height originated from the substantial amount of experiential and anecdotal data that makes atmospherics less credible. These two measures are a unique contribution to the existing research in this area. There appear to be no empirical studies that consider these two measures, and one will find only a small number of conceptual pieces that mention these two variables (Titus & Everett, 1995; Turley & Milliman, 2000). For instance, Smith and Burns (1996) studied the most efficient use of an aisle in a big grocery store. Smith and Burns looked at power aisles (aisle-design that entices shopping) and their characteristics. They found that certain configuration features (excluding aisle width) of these aisles conveyed lower or higher price perceptions. Most of the knowledge related to aisles, which is overwhelmingly anecdotal in nature, can be found in retailing textbooks, such as Berman and Evans (1995) or Levy and Weitz (2001), architectural texts, such as *The Architects' Handbook* (Pickard 2002), or visual merchandising books.

Academic research on shelf height is also scarce. Bitner (1992) suggests that the size (and shape) of the equipment used in retail environments is important to facilitate consumer performance and accomplishment of consumer goals. Titus and Everett (1995) proposed that excessively high shelves in shopping environments may make it difficult for shoppers to explore the environment and comprehend its overall spatial structure. This restricted visibility may also hamper the gathering of information in a retail environment. This is in line with Weisman's (1981) finding that the ability to see through an environment is an essential component (associated with the design of a place) for constructing an accurate cognitive map (the way how people store/organise environmental information in their memory). Indeed, these theoretical foundations and propositions encourage researchers to employ aisle width and shelf height as atmospheric variables and to use possible findings as seeds for more elaborate research into retail design.

As far as floor pattern is concerned, a number of retailing texts and studies support the notion that floor pattern is a salient design factor. Lewison (1994) advances that the configurations of selling floors are very important "because they influence in-store traffic patterns, shopping atmospherics, shopping behaviour, and operational efficiency" (p. 289). Sommer and Aitkens (1982) found in their research, using supermarkets as shopping environments, that products located in non-centre aisles can be recalled more easily than products located in centre aisles. A study by Merrilees and Miller (2000) found that store layout design is an important factor in assessing store loyalty.

Thus, it is logical to assume that the legibility of a retail environment is, to a great extent, dependent on the physical design and floor pattern of the environment (Markin, Lillis, & Narayana, 1976). In this context, Titus and Everett (1995) advance the following interesting proposition:

> Shopping environments possessing symmetrical design properties (e.g., grid aisle patterns, orthogonal path angels) will be perceived as more legible and less stimulating than environments containing more asymmetrical design properties (p.109).

Bitner (1992) defines floor pattern or (spatial) layout as the way in which "machinery, equipment, and furnishings are arranged, the size and shape of those items, and the spatial relationships among them" (p. 66). Along the same line, after having surveyed the applicable retailing literature, Vrechopoulos et al. (2004) identified the following two store patterns (Table 2.2) as the major floor patterns used in traditional and contemporary retailing:

Table 2.2 Grid Floor Pattern and Racetrack Floor Pattern

Floor Pattern	Description
Grid Pattern	The grid (pattern) is a rectangular arrangement of displays and long aisles that generally run parallel to one another. It has been showed that the grid layout *facilitates routine and planned shopping behavior*, providing consumers with flexibility and speed in identifying pre-selected products which appear on their shopping list... It is widely favored by the grocery sector because the majority of customers visiting grocery stores have planned their purchases.
Racetrack Pattern	In the racetrack (pattern), the sales floor is organized into individual, semi-separate areas, each built around a particular shopping theme. The racetrack store (pattern) leads the customer along specific paths to visit as many store sections or departments as possible, because the main aisle/corridor facilitates customer movement through the store. The retailer who adopts this (floor pattern) creates an unusual, interesting, and *entertaining shopping experience*.

Source: Vrechopoulos et al., 2004, p.14

The layouts in Figures 2.1 and 2.2 from Levy and Weitz's (2001) retail text illustrate the two aforementioned floor patterns:

Figure 2.1: Grid Store Layout Layout

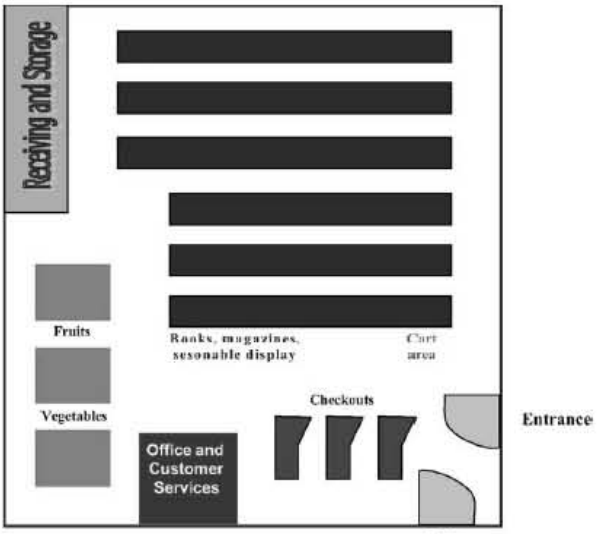
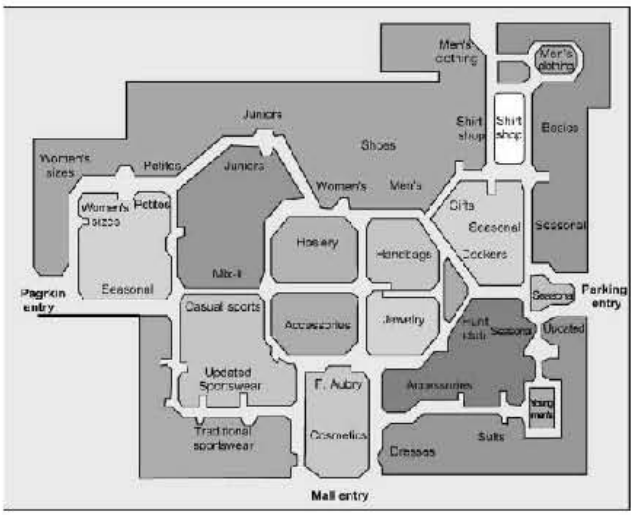


Figure 2.2: Racetrack Store



Source: Adapted from *Retail Management*, by M. Levy & B.A. Weitz, 2001/2007, p. 495. New York: McGraw-Hill/Irwin.

Following this discussion on atmospherics and retail design is a chapter that examines literature and theories relevant to environmental psychology; more specifically, literature and theories related to the Mehrabian-Russell model and Kaplan environmental preference framework.

2.3 Environmental Psychology

2.3.1 Environmental Psychology and Atmospherics

A major theoretical foundation for this research lies in the field of environmental psychology, and here in particular the built environment and the behaviour it elicits from individuals. Over the years scholars have managed to create an operational definition of what environmental psychology does, but seem to have failed to provide a conceptual definition of what environmental psychology is. A useful operational definition is provided in the *Handbook of Environmental Psychology* by Stokols and

Altman (1987), who argue that environmental psychology is "the study of human behaviour and well-being in relation to the sociophysical environment" (xi-xii). In later years, attempts to come up with an acceptable conceptual definition were not entirely successful, until Bell et al. (1996) approached the topic. In their book entitled *Environmental Psychology* Bell et al. (1996) advance the following definition for environmental psychology:

> Environmental psychology is the study of molar relationships between behavior and experience and the built and natural environments. (p. 6)

In this respect, *The Encyclopedia of Environmental Psychology* defines environmental psychology as the study of the "interrelationships between environments and human behavior" (DeYoung, 1999, p.1). Such environments can include social, built, or informational settings that can be subjected to rigorous research. The Encyclopedia goes on to say that the goal of studying such environments is to make predictions about how humans behave under certain environmental conditions (DeYoung, 1999). In this context, it is important to clarify that environments can be either natural or artificial (built). Predicting behaviour allows researchers to better manage or, in the light of ecological sustainability, protect such environments. Kaplan and Kaplan (1982) and Garling and Golledge (1983) note that several elements surface over and over again when exploring environmental psychology and could be worth studying when dealing with this form of psychology. The following are these elements (DeYoung, 1999, pp. 1-2):

1. Attention: Is an understanding for how people voluntarily or involuntarily notice the environment.
2. Perception and cognition maps: How people image the human and built environment. Information through this imaging is stored in the brain as spatial networks (cognitive maps) and, then, linked with one's recall of experiences (events, ideas, emotions).

3. Preferred environments: People seek out places where they feel in control and confident.
4. Environmental stress and coping: The failure of choosing a preferred environment due to uncertainty, lack of predictability, and stimulus overload.
5. Participation: Is the active participation of environmental actors in designing, managing, and restoring the environments.

Even though environmental psychology is accused of having a lack of theories to support its findings, upon closer examination one can find some useful theoretical frameworks. One environmental psychology approach is the arousal approach, which advances that environmental stimuli (e.g., social, ambient, design) lead to different emotional states of arousal. Depending on the level of arousal, various behavioural outcomes can be expected that could follow, under certain circumstances, an inverted U-shaped curve (Bell et al. 1996). Another theory is the information load model, which posits that our ability to take in information is limited and that, when too much information is offered (above the adaptation level), peripheral stimulants are ignored to enable the processing of primary stimulants (Bell et al., 1996). Yet another model is the stress model, which explains that certain stimuli are discomforting (threatening) and human beings develop coping mechanism to combat these irritating stresses (Bell et al., 1996). Compared to the previously discussed theories, Baker's ecological psychology model takes a different approach. It looks at the impact of the behaviour on the environment and the impact of the environment on the behaviour (Bell et al. 1996). Whereas the previous models describe a unidirectional process, this model emphasises a bidirectional relationship between the behaviour and the environment. This approach exhibits great potential to be employed in future atmospherics research but is not the subject of this study.

After having made a case for applying environmental psychology to examining the relationship between planned environments and human

behaviour, another question arises: Why study atmospherics? Building on the aforementioned foundations of environmental psychology, atmospherics is just an extension of these definitions, theories, and methodologies to retail settings. In this context, Kotler (1973) defines atmospherics as the "effort to design buying environments to produce specific emotional states in the buyer that enhance the purchase probability" (p. 50).

In the mid 1970s, theory was added to this field by Mehrabian and Russell (1974) who, despite the lack of a definition, saw potential in this area. They developed a widely used affect model based on the Stimulus-Organism-Response (SOR) paradigm that has proven to be robust across many related disciplines. One of these disciplines is atmospherics. Donovan and Rossiter (1982) are considered to be the researchers who introduced this model to atmospherics (retailing). This triggered a number of follow-up studies that explored different aspects of retailing.

With their 1982 study which employed the SOR framework/Mehrabian-Russell model, Donovan and Rossiter made a significant contribution to help establish atmospherics as a part of environmental psychology. In their study, Donovan and Rossiter chose different store environments as their research venues. The authors tested whether information rate and the emotional states of pleasure, arousal, and dominance allow researchers to predict approach and avoidance behaviour of consumers. They found that in pleasant store environments shopping-related intentions, such as shopping enjoyment and time spent browsing, increased with an increased level of arousal. However, it seemed as if dominance had only a small impact on approach-avoidance behaviour, and most responses to store environments could be described by pleasure and arousal only.

Since Mehrabian and Russell (1974) did not examine the cognitive domain, the Kaplan model emerged as an appropriate framework to inform this study. In a more general, environmental-psychology context, Kaplan and

Kaplan (1973, 1987) researched the synergies and friction points between human behaviour and the environment. Assuming that individuals might perceive environments in different ways, Kaplan and Kaplan (1982, 1987, 1998) developed a model of environmental preferences. This environmental preference framework (Kaplan & Kaplan, 1982, 1987, 1998) explains how people make sense of environmental information (understanding) and explore environments (exploration).

Retail environmentalists want to use those frameworks to design environments that trigger purchases and are easy to manage. They want to build customer confidence in the products they sell, preserve repeat-purchase behaviours, and add atmospherics to their arsenal of sales tools.

2.3.2 The Mehrabian-Russell Framework

In 1974, when confronted with the challenge to base their work on a suitable theory, Mehrabian and Russell were prompted to write that "as yet there is no adequate theory, or even the beginnings of a theory, of environmental psychology" (p.3). However, over the past three decades of research in atmospherics the following theory has positioned itself as the essential framework to investigate the environmental psychology of store design

> ...environmental psychology draws from the stimulus-organism response (S-O-R) paradigm. In this context, the atmosphere is the stimulus (S) that causes a consumer's evaluation (O) and causes some behavioural response (R) (Mehrabian and Russell, 1974; Donovan and Rossiter, 1982). The environmental psychology literature (Mehrabian and Russell, 1974) also indicates that shoppers respond to the atmosphere with one of two responses, approach or avoidance. (Turely & Milliman, 2000, p.193)

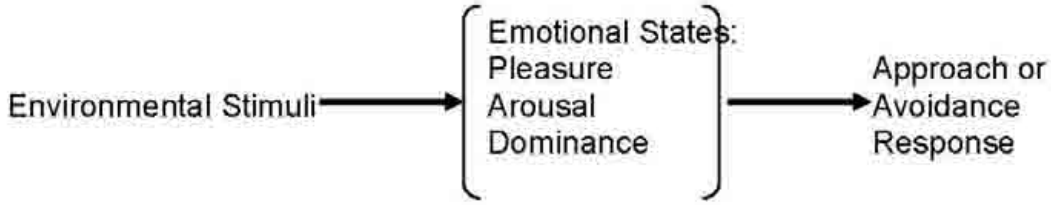
For the purpose of researching the shopping behaviour caused by store design, the framework designed by Mehrabian and Russell (1974) is one of the models which was used in this research, a model that is grounded in the SOR paradigm, which is a behavioural sequence that contains a stimulus, organism, and response. Other researchers concerned with store-related stimuli such as Donovan and Rossiter (1982), Baker, Grewal, and Levy (1992), and Sherman, Mathur, and Smith (1997), successfully employed the Mehrabian-Russell Model (M-R Model) to strengthen their work in this area of retailing. Especially, Baker, Grewal, and Levy (1992) made the model more accessible to atmospherics by adding an ambient, social, and design dimension. However, as Turely and Milliman (2000) reemphasise, "Atmospheric effects exist, but there has not been enough effort devoted to explaining, predicting, and controlling [these occurrences]" (p. 208).

The Mehrabian-Russell Model and Its Refinement

As mentioned in the preceding sections, the Mehrabian-Russell model (see Figure 2.3) has been used a number of times to research the built environment. In general, Mehrabian and Russell (1974) assert that "physical or social stimuli in the environment directly affect the emotional states of a person, thereby influencing his behavior in it" (p.8). This means that the environmental psychological processes are embedded in a stimulus-organism-response (SOR) framework, which works according to the principle that environmental factors (stimuli) affect the internal states of individuals; these internal states in turn trigger specific behavioural responses. Certain physical or social stimuli produce reactions/evaluations that can be assigned to one or more of three emotional responses: pleasure, arousal, and dominance. These three emotional states can be described by how an individual feels, how much an individual is stimulated, and how much an individual has the situation under control. Furthermore, pleasure, arousal, and dominance function as mediating variables that cause certain behaviours in respondents. According to the M-R model,

these outcomes can result either in an approach or avoidance behaviour (see Figure 2.3).

Figure 2.3: The Mehrabian-Russell Model



Source: Donovan & Rossiter, 1982, p.42

Later research by Russell and Pratt (1980) found that most responses to environments could be described by pleasure and arousal only, and that dominance could be omitted. A few years after Mehrabian and Russell's (1974) ground breaking work, Donovan and Rossiter (1982) adopted this approach and applied it to retail environments. Sidelining dominance as a mediating variable and neglecting the stimulus area of the model, Donovan and Rossiter designed an approach that presented pleasure and arousal as significant mediators of shopping behaviour.

To make the SOR framework more useful in the marketing domain, Baker, Grewal, and Levy (1992) introduced ambient, social, and design factors in their research. In their laboratory experiment they found that ambient and social factors influence pleasure and arousal. The measures of pleasure and arousal are effective variables to mediate between the stimulus factors and shopping behaviour.

Environmental Stimuli

The first component in the SOR and thus Mehrabian-Russell sequence is the stimulus. Environmental stimuli and conditions are diverse in nature and a taxonomy is not easy to develop. In the case of the Mehrabian and Russell (1974) model, an all-encompassing stimulus descriptor called

information rate is used. Donovan and Rossiter (1982) refer to this measure as "information load" and define it as the "degree of novelty or complexity" (p.40) an environment possesses; it is the quantity of elements in a particular environment and their degree of change. Depending on the information rate, different pleasure or arousal mediations will be achieved.

Compared to Mehrabian and Russell, Baker et al. (1982) take a more structured approach to environmental stimuli and assign the stimuli to one of three categories: ambient, social, and design. Ambient factors are mostly concerned with music (Milliman 1982), climate, and lighting. Social factors are the environmental conditions created by employees, customers and their interactions. Design dimensions, the subject of this study, address the architecture, layout, and other planned physical features of the environment.

Bitner (1992) developed an alternative set of stimulus dimensions when she undertook her study on servicescapes. She studied different types of service organisations through a framework that examines the effects of physical surroundings on customer and employee behaviour. The framework proposes that environmental dimensions (stimuli) such as ambient conditions, space, function, signs, symbols, and artifacts, facilitate the achievement of marketing goals. Bitner (1992) specifically mentions customer attraction, exploring, spending money, returning, and carrying out a plan as goals that can be influenced by physical surroundings.

Organism

The second component in the SOR process is the organism. At the organism stage the stimuli are evaluated by the individuals. Depending on the evaluation, a pleasure, arousal, or dominance outcome can be achieved (Mehrabian and Russell 1974). However, in later years, Russell and Pratt (1980) found that most of the mediation that takes place between the stimulus and response can be explained through pleasure and arousal only.

Furthermore, the information rate and the level at which information is processed play an important role in the organism process. Mehrabian and Russell (1974) advance that the information rate is directly correlated to arousal, keeping in mind that the information rate consists of the dimensions of novelty, complexity, and spaciousness. Another point of interest at the mediation stage is at which information-processing level the stimuli are evaluated. Stimuli can be processed either at an affective or cognitive level. Depending on the level, the individuals respond accordingly. The M-R model is an affective information-processing model. Affective emotional states could manifest themselves through, for instance, seeing a bear and running away, watching something funny and smiling, or touching a hot plate and instinctively pulling back the hand. Under such circumstances an instantaneous reaction without elaborate deliberation occurs. In comparison, cognitive (emotional) states involve much more information processing. For example, when a person is trying to find a way out of a building or figure out how to get from point A to point B, these situations involve a higher-order (cognitive) processing on behalf of the individual.

Responses

The last building block in the stimulus-organism-response sequence is the response. Mehrabian and Russell (1974) claim that responses can be assigned to either one of two behavioural categories: approach behaviour or avoidance behaviour. Approach-avoidance responses have four different dimensions:

1. The desire to physically stay or leave an environment
2. The urge to explore or not explore the setting
3. The willingness to communicate or not communicate in an environment
4. The desire of enhanced or decreased performance in a space.

(Donovan & Rossiter, 1982, p. 37)

When viewing these four approach-avoidance characteristics in the context of a retail environment, the following can be said: In a situation where the physical presence of an individual is required, the individual has the choice to remain or leave a particular shopping environment. If a customer is encouraged to approach a certain retail site, he or she might be inclined to do so in the future (on a repeated basis). Depending on the effect of the mediating variables of pleasure or arousal, a customer might want to further explore an environment. Communication as far as employees in a store are concerned could be key for a customer to actually make the purchase. All these tenets of approach-avoidance are important when it ultimately comes to a respondent's decision to buy (to perform).

The preceding paragraphs showed how the stimulus-organism-response model moves through the individual stages and defines how the components of the model work and interact. Stimuli (store design elements) influence pleasure and arousal (evaluation states). These emotional states mediate the effects of stimuli on responses and thus affect the behavioural outcomes (repeat patronage intention). However, while Mehrabian and Russell provided explanations for the affective part of this thesis, Kaplan (1987) has to be used to describe the cognitive part of this study, an environmental preference framework which is discussed in the upcoming section.

2.3.3 Environmental Preferences

Assuming that individuals might perceive environments in different ways, Kaplan and Kaplan (1982, 1987, 1998) developed a model of environmental preferences. This environmental preference framework (Kaplan & Kaplan, 1982, 1987, 1998) explains how people make sense of information (understanding) and explore environments (exploration). Through research related to this framework, Kaplan and Kaplan (1987, 1998) realised that information (environmental information needs) can be

further classified into time categories whereby environmental preferences can be formed instantaneously (two-dimensional like a picture) and in the long-term (three-dimensional like entering the picture). In other words, the information provided by an environment can be processed by an individual either at an immediate level (superficial evaluation of a retail setting) and/or at a more involved level (time-consuming evaluation) (Kaplan and Kaplan 1987, 1998). For instance, environmental coherence (e.g., grid floor pattern of a Walmart) can help with an immediate evaluation of the setting, which could be followed by a more in-depth evaluation of the setting as related to its legibility (e.g., finding the aisle for toiletry products in a Walmart). Another example would be that the immediately perceived complexity of an environment (e.g., first impression of Hamley's Toy Store's enormous toy assortment) invites a hedonic customer to engage in a more time-consuming exploration of what mysteries this environment holds (e.g., What toys are on the different floors of this six-story shop?). Following is a matrix (Figure 2.4) that illustrates the Kaplan framework:

Figure 2.4: Kaplan Preference Framework

	Understanding	Exploration
Two-dimensional (immediate)	Coherence	Complexity
Three-dimensional (inferred)	Legibility	Mystery

Source: Kaplan et al., 1998, p. 13

In this respect, Kaplan (1987, 1998) describes the four components that make up the matrix as follows:

1. Coherence: The degree to which objects in an environment hang together
2. Legibility: The level of distinctiveness of an environment which allows actors in this environment to organise the content of the environment

3. Complexity: The number and variety of elements in the environment
4. Mystery: The degree to which an environment holds hidden information and, thus, attracts an individual to uncover this information.

Based on these elements and how they work in the context of this framework, this model is well-suited to be applied to research in atmospherics (retail design); more specifically, the coherence and legibility part of the model is especially suited for this application. The concepts in the model are relatively easy to generalize and show how information is organised and help consumers understand the environment. One of the ways in which people organise and understand this information (e.g., environmental coherence, environmental legibility) is through employing a cognitive map. Downs and Stea (1972) and Kaplan (1987) explain that cognitive maps illustrate how people store (organise, make coherent) this environmental information in a very basic form and how people understand this information (legibility). Kaplan (1973) defines a cognitive map as information that is stored in the head in a "simplified" manner which "is coded in a [mental] structure" that is in our heads. "It is as if an individual carried around a map or model of the environment in his head" (Kaplan, 1973, p. 276). A cognitive map can also be seen as a personal representation of an environment (Kitchin, 1994) which one experienced (see also Evans, 1980; Garling & Golledge, 1993; Lynch 1960). Thus, a cognitive map helps people to make sense of information (coherence), which, for instance, helps someone to find his or her way through an environment (legibility).

In this context, Kaplan (1973) places environmental coherence under the heading of legibility, which is characterized by symmetry, repeating elements, unifying texture, redundancy, and organisation; coherence that can be viewed in conjunction with a retail environment as the symmetry (e.g., grid floor pattern), repetition of elements (e.g., only high shelves), and

unifying texture (e.g., narrow aisles) of a shop environment. Here, Kaplan (1973) constructs the link between coherence and legibility (in the Kaplan model) with cognitive maps, which help an individual to make sense of the environment (and read his/her cognitive map). Thus, the coherence of an environment determines, in no small part, the legibility of an environment.

The Kaplan model has been employed in a number of studies to make sense of the environment. For instance, Leventhal (1988) has employed the Kaplan framework to study the aesthetics of computer programming. Other studies utilising this framework have dealt with issues such as understanding the influences of atmospheric cues on the emotional responses and behaviours of museum visitors (Kottasz, 2006) and various applications geared towards improving the design of Web pages. As a matter of fact, Stamps (2004) reports about 61 studies that employed the preference constructs of coherence, legibility, complexity, and mystery (in one way or another) to built and natural environments. However, physical retail environments are a new area that invites more research based on this model. Following is a more in-depth discussion of the element of legibility.

Legibility

To find one's way from Point A to Point B in a given environment can be challenging. That is the point where legibility and wayfinding enter the stage, two concepts that have a profound impact on urban planning, architecture, and, lately, retail design. Lynch (1960) was the first to provide a comprehensive discussion of the concept of environmental legibility in his well-known book on cognitive mapping, *The Image of a City*. He saw environmental legibility as a "psychological construct" and defined it as "the ease with which its part can be can be recognized...organized into a coherent pattern" (Lynch, 1960, p.2). Weisman (1981) views legibility as an important component that supports the process of wayfinding. A few years later, Passini (1984) associated the legibility of an environment with how simple it is to extract information from a setting and comprehend the setting.

The more a place supports this extraction and comprehension of information, the higher is the legibility (Passini 1984). If entrances, aisles, signs, and so forth in a store are not clearly organised, it will be difficult to understand the environment and find one's way. Wayfinding, as defined by Downs and Stea (1977), is the "process of solving one class of spatial problems, the movement of a person from one location on the earth's surface to another" (p. 55). Passini (1984) saw wayfinding as the "skill of a person to determine where they are in a physical setting,...including the ability that consists in determining what to do to reach a place" (p.43). According to Weisman (1981), there are four different types of environmental variables (environmental information) that influence wayfinding: the types of signage provided, the configuration differences between settings, the ability to see through a setting, and the layout of a setting.

As mentioned before, people (shoppers) find their way through an environment by extracting information and trying to comprehend how the environment is organised (Passini 1984). This trying to comprehend the environment helps people to construct a cognitive map. Numerous studies have been conducted in the area of legibility/wayfinding. Weisman (1981) saw the complexity of plan configuration as an important factor in wayfinding. Subsequently, Weisman (1981) found in one of his studies that students got lost less often in university buildings that were perceived as more legible. In the same context, O'Neill (1991) discovered that increases in the complexity of plan configuration significantly decreased the comprehension of the environment and the wayfinding performance of people.

What can be gathered from the previous discussion is that (environmental) legibility is considerably dependent on the physical design and layout of an environment (Markin, Lillis, & Narayana, 1976) and that the ability to see

through an environment is an essential component for building a cognitive map (Weisman, 1981).

Having presented the essential points of atmospherics and environmental psychology for the study at hand, the next part of the literature review discusses how motivation and especially motivational shopping orientation fit into this thesis research and conceptual model, which use the design cues of shelf height, aisle width, and floor pattern.

2.4 Motivation

2.4.1 Theories of Motivation

Before taking a closer look at shopping orientation, the primary topic of discussion in the next section, it is necessary to examine some of the theoretical foundations of shopping orientation. More specifically, the following question has to be raised: What drives or motivates consumers to shop? Motivation theory is an essential part of consumer behaviour theory that has its origins in psychology and is associated with such names as Sigmund Freud and Abraham Maslow.

Many theories of motivation have been proposed in the past to explain why people do what they do. Among those are the psychoanalytical theory of Freud (1948), the drive theory of Hull (1952), and the need theory of Maslow (1954). Then again, many of these theories concentrate on the affective tenets of motivation. In contrast, contemporary motivation research is also keen to look at the cognitive tenets and elaboration processes of motivation. Embedded in these approaches is what is commonly known as goal theory (Bettman 1979).

However, before examining goal theory and creating an understanding for its dynamics, it is necessary to assign motivation a proper definition. Simon

classifies motivation "as the mechanism governing movement from one state to another.... [He] postulates that consumers develop a set of goals which are to be achieved by progressing from the initial state toward the consummation of the choice" (Simon 1967, cited by Bettman, 1979, p.44). Bettman (1979) argues that "motivation affects both the direction and intensity of the behavior.... Thought processes affect structures and interpretation of one's goals" (p. 18).

This is the point where goal theory enters the stage. A goal is, according to Bettman (1979), "a specific state which, when attained, is instrumental in reaching the desired end state" (p. 19). This theory describes a choice process that is concerned with the following consumer-related questions: What is a consumer's current state? What is the customer's desired state? And how can the consumer reach the desired state? Using the example of a task-oriented customer who shops for groceries, one could infer that this shopper's refrigerator is empty (current state) and the customer needs to purchase some basic food items to get through the weekend. The customer wants to acquire these items (desired state) with minimal effort and complete his task in an efficient fashion and manner (process to reach the desired state). He sets the goal to visit Mr. Chen's grocery store this very same day at 10 pm to buy the required items. With a small number of customers shopping at this time at Mr. Chen's sales establishment, he accomplishes his goal in the anticipated manner. He most certainly did not derive a lot of joy from the actual shopping activity itself and undertook this activity out of necessity.

In the context of this choice shopping process it is likely that the shopper develops a hierarchy of goals that direct the shopper's behaviour to the desired state. However, more often than not, these goals/subgoals are constructed while the consumer is moving through the choice process. Bettman (1979) advances that "these goals [or hierarchy of goals] direct the consumer's behavior during the decision process. The notion of goal

hierarchy speaks not only to the directional influence of motivation, but also to the influence of intensity" (p. 18).

2.4.2 Shopping Orientation as a Moderator

Retail stores spend a lot of money to dress up. This dressing up is undertaken to make the store interior environmentally pleasing (appealing) to customers so that they want to spend time in the shopping environment (approach) and then ultimately engage in purchasing. As an example, Toys "R" Us invested $35 million in its New York store in Times Square to construct "the ultimate toy store that is the personification of every kid's dream in order to create an engaging environment for its young audience" (Prior 2001, as cited by Kaltcheva & Weitz, 2006, p.107). It is important to understand what arouses shoppers, thus, makes for a pleasant shopping experience. More specifically, how are consumer arousal and pleasantness linked with each other? Based on the Mehrabian-Russell framework, Kaltcheva and Weitz (2006) propose the following relationship between the motivational orientation of a shopper, arousal, and pleasantness:

> Motivational orientation moderates the effect of arousal on pleasantness: Arousal (a) decreases pleasantness for consumers with a task-oriented motivational orientation and (b) increases pleasantness for consumers with a recreational motivational orientation (Kaltcheva & Weitz, 2006, p.110)

According to Kaltcheva and Weitz's research, motivational orientation used as a moderating variable between arousal and pleasantness generates research results that alleviate some of the research inconsistencies found in atmospherics. For instance, while Milliman (1982) discovered in his research that arousal decreases purchase intentions and spending in supermarkets, Sherman et al. (1997) found that arousal has a positive effect on intentions and spending in fashion stores. It seems obvious that

shopping for basic food items triggers less arousal than shopping for endearing fashion apparel.

Research in this area has mostly focused on the outcome (pleasure) of the shopping experience and neglected to pay closer attention to what moderates the relationship between arousal and pleasantness and what role arousal plays. One variable that could be a possible moderator between these two measures is, as previously mentioned, motivation (Kaltcheva & Weitz, 2006). Among the first studies that placed motivational labels on shoppers was the research undertaken by Bellenger and Korgaonkar (1980). The researchers distinguished between economic shoppers and recreational shoppers. Another study by Dawson, Bloch, and Ridgeway (1990) categorized customers as having motives that could be either product-oriented or experiential. Babin, Darden, and Griffin (1994) employed a terminology that is more widely used in retailing. They saw shoppers as either possessing utilitarian or hedonic shopping values. This research will be discussed in more detail in the next section.

Arousal, in this context, can be viewed as a unique consumer component. Berlyne (1960) argues that arousal "is a state of how wide awake the organism is.... The lower pole of the continuum is represented by sleep or coma, while the upper pole would be reached in states of frantic excitement" (p. 48). Mehrabian and Russell (1974) describe arousal as an affective dimension, as a "feeling state" (p. 15), that shows how ready the organism is to react to something. In addition, Mehrabian and Russell (1974) tested arousal as a semantic differential measure that uses such bipolar descriptors as "calm-excited," "dull-jittery," and "sleepy-wide awake" (p. 216). Donovan and Rossiter (1982) define arousal as "the degree to which a person feels excited, stimulated, alert, or active in the situation" (p. 38).

Applying common sense, a particular environment's pleasantness is "assessed from the average level of pleasure reported by a group of raters

in that setting" (Mehrabian & Russell, 1976, p. 63). Pleasantness will also, to a large extent, depend on the nature and scope of the stimulus that triggers this response. Mehrabian and Russell (1974) equated the dimension of pleasantness with a "feeling state" (p. 18) that can manifest itself through behaviour, such as smiling and laughter. Donovan and Rossiter (1982) built on Mehrabian and Russell's research and argued that pleasantness-unpleasantness are two dimensions that represent people's emotional responses to a great number of environments. Returning to the example of the restaurant, the ambiance of a dirty and expensive restaurant will not be perceived as pleasant as the ambiance of a clean restaurant that charges reasonable prices and has a lovely marina view.

2.4.3 Types of Shopping Orientation and Research on Shopping Orientation

Motivation has been the focus of retailing since serious research in consumer behaviour began (Blankertz, 1949; Dichter, 1964; Haire, 1950; Haley, 1968; Henry, 1976; Martineau, 1958; Newman, 1957; Ray & Wilkie, 1970; Sternthal & Craig, 1974; Vinson, Scott, & Lamont, 1977). One of the earliest studies in this area was Blankertz's (1949) research on motivation and rationalization in retail purchasing. This study set out to determine the underlying reasons for retail patronage, thus it attempted to ascertain why people buy in certain retail settings. Years later, Tauber (1972) did research based on the premise that there are psychological needs other than those associated with the acquisition of the product. Due to this assertion, Tauber discovered that both personal and social motivations affect shopping behaviour.

More recently, the focus of the motivational theme has shifted to one of its subtopics, which is concerned with shopping orientation. Bellenger and Korgaonkar (1980) referred to shoppers as either economic or recreational individuals. In their opinion the economic shopper, when compared to the recreational shopper, "perceives the cost of shopping to exceed the value

gained in terms of pleasure and/or information" (Bellenger & Korgaonkar, 1980, p. 80). The research of Bellenger and Korgaonkar (1980) defined the recreational shopping motivation as how leisure time (alternative use of time) is used for shopping and found that the time spent to buy items was more pleasurable for recreational than economic shoppers. In addition, their findings suggested that atmospheric elements and store merchandise were the most effective methods to attract the recreational shopping segment.

Dawson, Bloch, and Ridgeway (1990) viewed customers in a slightly different light. They distinguished between individuals that possess either product-oriented or experiential shopping motives. Product-oriented shopping motives are prompted "by purchase needs or the desire to acquire product information" (Dawson, Bloch, & Ridgeway, 1990, p. 409). The experiential predisposition encourages consumers to visit stores "for the pleasure inherent in the visit itself" (Dawson, Bloch, & Ridgeway 1990, p. 410). In their study Dawson et al. (1990) tried to determine whether shopping motives affect retail outcomes (preference and choice). Indeed the research found that this relationship was mediated by the emotional reactions of customers. As proposed by Dawson et al. (1990), the research revealed that customers with strong product/experiential shopping motives had the most pleasure or arousal. Furthermore, consumers with experiential shopping motives seemed to have higher pleasure and arousal caused by the shopping environment than those with product motives.

Babin, Darden, and Griffin (1994) employed more conventional terms to describe shoppers. In their view, utilitarian shopping values are gained "from some type of conscious pursuit of intended consequences....Utilitarian consumer behavior has been described as ergic, task-related, and rational" (Babin, Darden, & Griffin, 1994, p. 645). This value approach has to be differentiated from the hedonic predisposition, in which shopping values are derived from "spontaneous hedonic responses.... Thus, hedonic shopping value reflects shopping's

potential entertainment and emotional worth" (Barbin, Darden, & Griffin, 1994, p. 645). Ultimately, this dichotomy was used to develop and validate a scale that measured both value dimensions. The development of this measurement instrument allowed Babin et al. (1994)to demonstrate the unique nature of the shopping values on either side of the hedonic-utilitarian spectrum.

Kaltcheva and Weitz (2006) examined these orientations in relation to arousal and pleasantness. As mentioned earlier, in their framework the authors considered motivation as a possible variable that moderates between the arousal generated through a store environment and the pleasantness of the environment. Kaltcheva and Weitz (2006) employed two experiments to test and support their framework. It was found that consumers with recreational motivational orientation who shopped in a high arousal environment experienced an increase in pleasantness. The opposite was true for task-oriented customers. Furthermore, the research revealed that in shoppers with a recreational focus, high arousal increased intentions to spend time and make purchases. On the contrary, a task-oriented focus decreased these intensions. The two studies used by Kaltcheva and Weitz to conduct research on their framework were based on a 2x2x2 and 2x2 experimental design, respectively. The experiments employed complexity, colour warmth, and colour saturation as well as music as independent variables, and pleasantness and shopping behaviour as dependent measures. Both research efforts found that motivational orientation significantly moderated the effect of arousal on pleasantness.

Motivation and shopping orientation, as portrayed in the literature and research, boil down to one simple and yet crucial dichotomy which is viewed in this research under an atmospheric lens: hedonic and utilitarian. The previously discussed alternative labelling of the economic and hedonic orientation should not deter from the actual reason why this variable is employed—that is, this motivational dichotomy is used as a moderator between arousal and pleasantness (affective path) and between legibility

and tangible service quality (cognitive path), relationships which are part of the greater SOR model.

2.5 Summary

This chapter reviewed the major literature and theories related to the research at hand. As can be seen, a literary structure emerged that places store atmospherics at the centre of the discussion, an area which is enveloped in theory provided by environmental psychology and aided by motivation theory. The atmospherics of a store are a very promising area of research, especially, when examined in the light of (retail) design. Donovan and Rossiter (1982) and Baker, Grewal and Levy (1992) provided the seeds for the atmospherics research in this thesis. At the core of these authors' thinking is that the atmosphere (e.g., shelf height, aisle width, floor pattern) is the stimulus (S) that causes an affective (or cognitive) consumer evaluation (O) and causes some behavioural approach-avoidance or repeat patronage response (R). However, it has to be mentioned that Donovan and Rossiter's (1982) and Baker, Grewal and Levy's (1992) research is embedded in the affective, approach-avoidance work of Mehrabian and Russell (1974). Yet, Mehrabian and Russell (1974) fall short of adequately accounting for cognitive information processing. For this reason parts of the Kaplan environmental preference framework (1987) were introduced, a model that considers attributes (e.g., coherence) of design elements, such as shelf height, aisle width, and floor pattern, and links them with environmental legibility. Furthermore, Baker, Grewal, and Parasurman's (1994) research links legibility with (tangible) service quality, considered as mediating the effect of legibility on the outcome variable on the cognitive path in this thesis.

In addition, this thesis employs Kaltechva and Weitz's (2006) effort to refine Mehrabian and Russell's (1974) work with motivation theory, which proposes that shopping orientation moderates the effect of arousal on pleasantness, affectively. More directly, the study distinguishes between

individuals that possess either a task-oriented or recreational shopping orientation. The given thesis research also extends this reasoning to the cognitive path and proposes that shopping orientation moderates the effect of legibility on tangible service quality.

Following the discussion of atmospherics, environmental psychology, and motivation and motivational orientation is the next chapter, which attempts to combine this literature and these theories into a framework that is then examined through the appropriate statistics. More specifically, this chapter will look at the model in four major parts: the part that stimulates an atmosphere; the part that allows cognitive evaluations of this atmosphere; the part that permits affective evaluations of the environment; and finally the part that examines the intended shopping behaviour that results from evaluations of the environment.

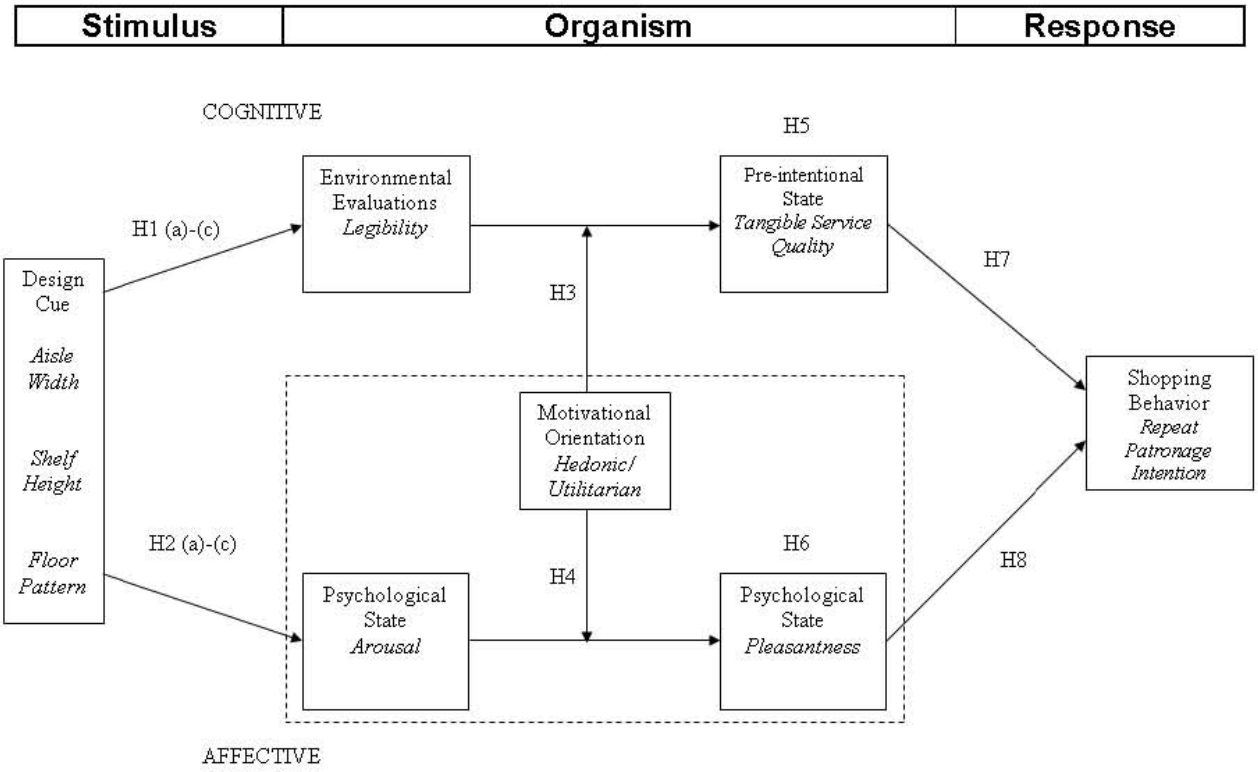
CHAPTER III
THE PROPOSED FRAMEWORK

3.1 Introduction

The literature and theory examined in the previous chapters is used to create a model that, in broad strokes, explores whether certain retail design features entice consumers to buy. The proposed model provides paths for the cognitive as well as affective environmental evaluations of consumers. Both routes are explored by employing the factors of shelf height, aisle width, and floor pattern as retail design cues. In this respect, the cognitive route looks at what impact environmental preferences (Kaplan, 1987) have on the outcome variable, while considering the shopping orientation of respondents. For the affective route the relationship proposed by Kaltechva and Weitz (2006), that shopping orientation moderates the effect of arousal on pleasantness, is subjected to closer examination. Such cognitive and affective evaluations of retail environments may influence the tangible service quality perceptions and repeat patronage intentions of consumers.

The proposed framework possesses several unique characteristics. First, it considers the design elements of shelf height, aisle width, and floor pattern, as having an impact on buyer behaviour (intentions to behave). Second, this structure extends major parts of the Kaplan (1987) environmental preference framework to regular retail environments. Third, the model looks at what role tangible service quality plays between environmental preferences and purchase behaviour (intentions to behave). Fourth, it examines whether motivational shopping orientation moderates the effect of legibility on tangible service quality. Fifth, the model relates the Kaltechva and Weitz (2006) framework to context-specific, newly proposed retail design cues. Figure 3.1 presents the proposed model for the study.

Figure 3.1: Proposed Model



The following paragraphs present this framework and the related hypotheses in an incremental manner. First, the section of the framework and the hypotheses that concern themselves with the retail design cues are discussed. Second, the part of model and the hypotheses as related to Kaplan's environmental preferences is discussed and amended with tangible service quality. Third, the part related to the Kaltechva and Weitz arousal-pleasantness framework is introduced. Finally, the shopping behaviour hypotheses and a summary diagram of hypotheses are presented.

3.2 Design Cues

From the previous discussion on retail design cues in the atmospherics chapter two (section 2.2), it can be gathered that the purposeful creation of a store design might be able to elicit certain psychological processes or states in consumers. In this context, retail design cues are suggested to

support shoppers in forming their cognitive maps, which in turn can help them to understand the store environment (Downs & Stea, 1972, Kaplan, 1987; O'Neill, 1991). Thus, creating coherent (e.g., symmetric (grid floor pattern), repetitious (only high shelves), unifying (narrow aisles)) and legible store environments by using shelf height, aisle width, and floor pattern as design cues is proposed to help consumers better understand the environment and to contribute to successful shopping outcomes (Merrilees & Miller, 2001; Smith & Burns, 1996; Sommer & Aitkens, 1982; Titus & Everett, 1995; Vrechopoulos et al., 2004). Mehrabian and Russell (1974) and then Machleit, Eroglu, and Mantel (2000, 2005) discovered that there is a positive, direct relationship between unorganised, visually inaccessible environments and the arousal these settings can generate. Smith et al. (1987) and Titus and Everett (1995) found that it is easier for individuals to form a coherent (legible) whole of environments containing visual symmetry than of those containing visual asymmetry. Following this logic, a shopping environment which is, for instance, more symmetric (e.g., grid pattern), more visually accessible (e.g., low shelves) and has more space (e.g., wider aisles) is proposed to be perceived as less arousing and more legible. Therefore, the following hypotheses for legibility can be advanced.

H1(a): A store environment with low shelves will result in a higher level of legibility than a store environment with high shelves.

H1(b): A store environment with wide aisles will result in a higher level of legibility than a store environment with narrow aisles.

H1(c): A store environment with a simple floor pattern will result in a higher level of legibility than a store environment with a complex floor pattern.

With regards to arousal, the following hypotheses can be advanced:

H2(a): A store environment with low shelves will result in a lower level of arousal than a store environment with high shelves.

H2(b): A store environment with wide aisles will result in a lower level of arousal than a store environment with narrow aisles.

H2(c): A store environment with a simple floor pattern will result in a lower level of arousal than a store environment with a complex floor pattern.

3.3 Environmental Perceptions

Kaplan (1987, 1998) advances that the legibility of an environment is characterized by the level of distinctiveness of an environment which allows actors in this environment to organise the content of the environment. Legibility helps an individual to understand the environment, which supports the individual in forming/reading his or her cognitive map (Kaplan, 1973). In this context, it should not be surprising that the more legible an environment is, the better one can navigate (find his/her way) through the environment (O'Neill, 1991). For instance, Titus and Everett (1995) proposed that environments with symmetrical design features (e.g., grid floor pattern) will be perceived as more legible than environments with asymmetrical features (e.g., racetrack floor pattern). Furthermore, Baker et al. (2002) suggested that customers' positive perceptions of retail design constructs (e.g., legibility) raise the perception of service quality. Thus, one can infer that a retail environment which possesses high legibility is more appealing to a consumer and is perceived to provide a higher level of service (tangible service quality).

Yet another question that arises in this context is whether a highly legible environment provides the same tangible service quality for hedonic and

utilitarian shoppers; more specifically, does shopping orientation moderate the effect of environmental legibility on tangible service quality? In their consumer-retail-search-process (CRSP) model Titus and Everett (1995) proposed that spatial configurations (e.g., aisle width, shelf height, layout) shape environmental perceptions/preferences of consumers (e.g., legibility). In turn, the authors suggested that the effect of legibility on retail satisfaction (service satisfaction) is mediated by an epistemic-hedonic shopping orientation. Yet, this thesis research views epistemic and hedonic behaviour (shopping orientation) as moderating rather than mediating the legibility-service quality relationship, because previous theory and research (Kaltechva & Weitz, 2006) indicates that shopping orientation would vary (moderate) rather than process (mediate) the relationship between environmental legibility and tangible service quality. This means that the relationship between environmental legibility and tangible service quality would strengthen or weaken rather than break down when the shopping-orientation variable is isolated.

Therefore, attempting to answer the aforementioned question, the following hypothesis can be generated:

> H3: The motivational shopping orientation of a consumer moderates the effect of legibility on tangible service such that: There is a positive relationship between legibility and tangible service quality perceived by a consumer with a utilitarian motivational orientation. There is a negative relationship between legibility and tangible service quality perceived by a consumer with a hedonic motivational orientation.

3.4 Arousal-Pleasantness Framework

Research in the motivational realm has mostly focused on the outcome (pleasure) of the shopping experience and pays less attention to what

moderates the relationship between arousal and pleasantness and what role arousal plays. One variable that has been suggested as a moderator (Kaltechva & Weitz, 2006) between these two measures is motivational shopping orientation. Among the many forms of motivational shopping orientation, the most widely described are the hedonic and the utilitarian orientation (Bellenger & Korgaonkar, 1980; Darden & Griffin, 1994; Holbrook & Hirschman, 1982). In this context, Kaltcheva and Weitz (2006) found in their research that "motivational orientation moderates the effect of arousal on pleasantness: Arousal (a) decreases pleasantness for consumers with a task-oriented motivational orientation and (b) increases pleasantness for consumers with a recreational motivational orientation" (p. 110). Grounded in Kaltcheva and Weitz's (2006) work (Chapter II, 2.4.2), this study attempts to produce new evidence to support the notion that shopping orientation moderates the effect of arousal on pleasantness and thus impacts shopping behaviour (intentions to behave); shopping behaviour (intentions to behave) as related to repeat patronage intention. Using this information, the following hypothesis can be developed:

> H4: The motivational shopping orientation of a consumer moderates the effect of arousal on pleasantness such that: There is a positive relationship between arousal and pleasantness perceived by a consumer with a hedonic motivational orientation. There is a negative relationship between arousal and pleasantness perceived by a consumer with a utilitarian motivational orientation.

As proposed and tested in the Kaltechva and Weitz (2006) model, it can be advanced that pleasantness mediates the relationship between arousal and repeat patronage intention:

> H6: The pleasantness of a store environment mediates the effect of arousal on repeat patronage intention.

3.5 Tangible Service Quality

Based on Zeithaml's (1985, 1988) work, this study defines tangible service quality perceptions, which are used in this context as a mediating measure, as the functional, visually appealing, and up-to-date physical aspects of a retail store whose appearance is in line with the type of service provided. The link between the environmental preference examined (legibility) and the tangible service quality perceived by a consumer is apparent in the theories and concepts that have previously been discussed in this thesis. The overarching theory for this relationship is the stimulus-organism-response model (SOR model). However, taking a more detailed look at this relationship, it can be seen that it has various components which fit within the framework proposed by Baker, Grewal and Pararsuraman (1994), a framework that describes the causal chain of the impact atmospheric factors have on store image. Baker, Grewal and Pararsuraman (1994) posited that service quality mediates the effect of atmospheric factors, such as social, ambient and design, on responses to certain types of store image. For instance, Baker, Grewal, and Parasuraman (1994) found that shoppers associate a higher quality in service with an environment that possesses a prestige-image (ambiance) and vice versa. In a later study Baker, Parasuraman, Grewal, and Voss (2002) developed a similar conceptual framework based on the SOR model, which advances that service quality, price and merchandise value mediate the effect of store environmental factors on store patronage intentions. In this context, this thesis focuses on the mediating properties of tangible service quality; more specifically, when following this theme it can be assumed that tangible service quality mediates the effect of legibility on repeat patronage intention. Hence, the following hypothesis is advanced:

> H5: Tangible service quality mediates the effect of legibility on repeat patronage intention.

3.6 Shopping Behaviour

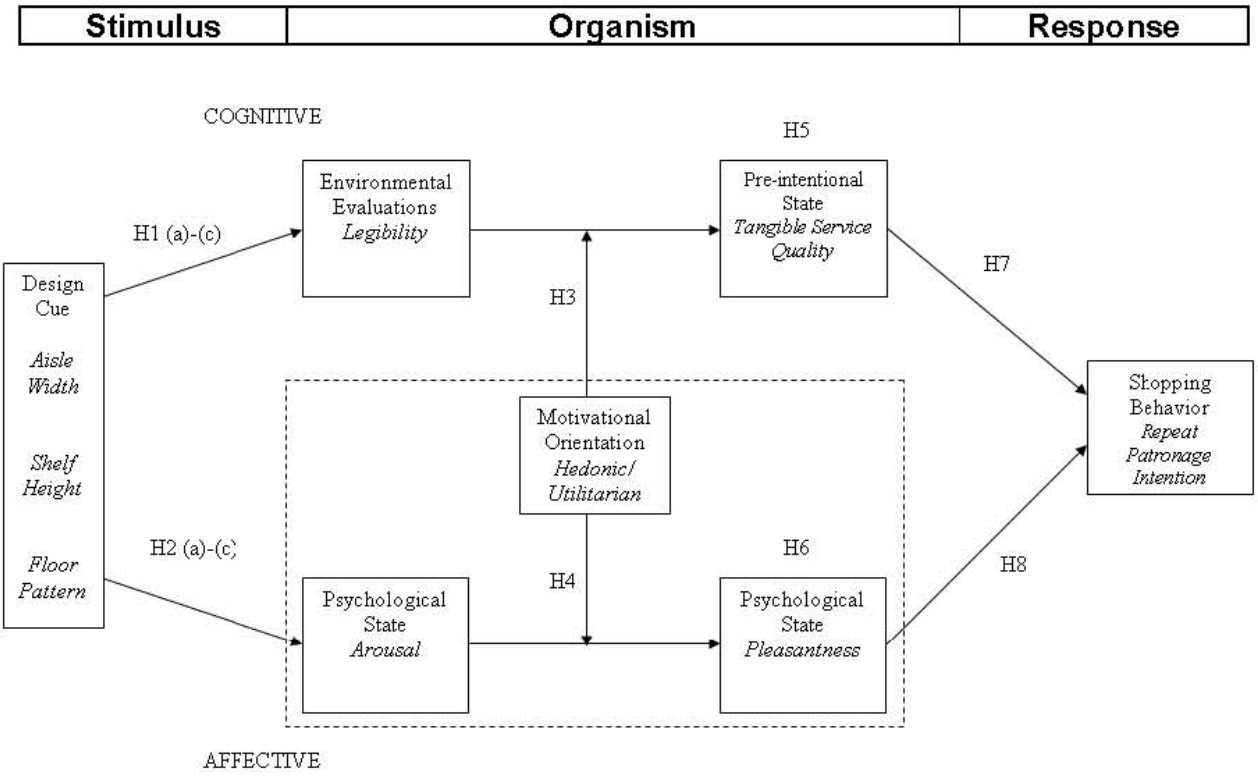
Several marketing studies suggest that repeat patronage intention (Cronin & Taylor, 1992; Jones, Mothersbaugh, & Beatty, 2002; Oliver & Swan, 1989; Wakefield & Baker, 1998; Zeithaml, Berry, & Parasuraman, 1996) is a viable outcome measure for research in atmospherics and theoretically links to tangible service quality and pleasantness. In this respect, Zeithaml et al. (1996) associated the construct of repeat patronage intention with intentions to behave, such as preferring one store over the other, repeatedly purchasing from this store, and doing more business with this retail establishment in the future. Along the lines of Zeithaml's et al. (1996) approach to repeat patronage intentions is the approach used by Baker and Wakefield (1998) and by this study, which defines repeat patronage intentions as a high likelihood of shopping and shopping more frequently at a particular store. Repeat patronage intention is already part of the purchase intention measure used by Kaltechva and Weitz (2006) and thus a viable outcome variable for the research at hand. Following are the shopping behaviour hypotheses H7 and H8, which are tested as shopping behaviour (intentions to behave) variables.

> H7: A high level of tangible service quality will result in a higher consumer repeat-patronage-intention when compared to a low level of tangible service quality.

> H8: A high level of store environment pleasantness will result in a higher consumer repeat-patronage-intention when compared to a low level of pleasantness.

3.7 Summary Diagram of Hypotheses

Figure 3.2: Summary Diagram of Hypotheses



The upcoming chapter discusses the methodology utilised to test the proposed model.

CHAPTER IV
METHODOLOGY

4.1 Introduction

The following chapter discusses the methodological issues important to the empirical testing of the proposed model. First, the research design used for the two studies is outlined. Second, the characteristics of the subjects chosen for this research are presented. Then the ethical considerations related to this research are discussed. This is followed by a description of the two sets of stimulus materials used to achieve effective manipulations. The measurement scales are then discussed, and finally the results of a pretest concerning the environmental preference part of the model are presented.

4.2 Research Design

A theory needs a proper methodology to be tested and studied. Amongst others, one of the methodologies most widely used in environmental psychology to investigate cause-and-effect relationships in environments is experimental design (Bell et al., 1996). Experimental design is ordered research whereby the effect of an independent variable (e.g., aisle width) on a dependent measure (e.g., purchase intention) is studied. The reason for this method being employed in the given study is because it is a systematic, reliable, and controllable approach that is suggested by the basic theory (environmental psychology) underlying this research (Bell et al. 1996) and used in atmospheric studies of similar nature (e.g., Baker, Grewal , & Levy 1992; Donovan & Rossiter 1982; Kaltechva & Weitz; 2006).

The research was conducted using two laboratory experimental studies, which tested the hypotheses developed from the proposed theoretical

framework. These two studies only differed in the stimulus material used to enable the desired manipulations: Study 1 used pictures of store environments, whereas Study 2 utilised virtual store environments. Each study was a 2x2x2x2, between-subjects design (factors: shopping orientation, shelf height, aisle width, and floor pattern), which tested the environmental preference (Kaplan, 1987, 1998)/cognitive parts and the arousal and pleasantness (Kaltechva & Weitz, 2006)/affective parts of the proposed model. Study 2 (virtual environments) allowed further examination (attempt of replication) of the findings of Study 1 (store pictures). In general, the framework tested the effect of the independent measures (shelf height, aisle width, floor pattern, shopping orientation) on intended consumer behaviour; more specifically, on repeat patronage intention.

Following is a diagram (Table 4.1) which illustrates the experimental design used for the two studies:

Table 4.1 The Experimental Design of Study 1/Study 2

Shopping Orientation	Aisle Width	Shelf Height	Floor Pattern	Treatment No.
Hedonic	Wide	High	Simple	1
			Complex	2
		Low	Simple	3
			Complex	4
	Narrow	High	Simple	5
			Complex	6
		Low	Simple	7
			Complex	8
Utilitarian	Wide	High	Simple	9
			Complex	10
		Low	Simple	11
			Complex	12
	Narrow	High	Simple	13
			Complex	14
		Low	Simple	15
			Complex	16

To test and explain the proposed framework, it is important to use robust statistical procedures that generate viable results. Analysis of variance is the primary statistical technique employed in this and related research (Baker, Grewal, & Levy, 1992; Grewal & Baker, 1994; Kaltechva & Weitz, 2006; Vrechopoulos et al., 2004) to test hypotheses. In addition, appropriate sample sizes have to be used for the studies at hand in order to obtain sufficient statistical power (Cohen, 1988). Hair, Anderson, Tatham, and Black (1998) suggest a cell size of at least 20 observations. Thus, with 16 cells the research used a sample size of 320 (16x20) for Study 1 and Study 2, respectively.

4.3 Research Subjects

The participants recruited for the research were undergraduate and graduate students from different universities. Data was gathered from a total of at least 640 respondents (320 for Study 1, 320 for Study 2). Students are appropriate subjects for this kind of study since medium-size stores (e.g., supermarkets, convenient stores, clothing establishments, music shops), which can be found on most high-streets and in most shopping centres, are an essential part of these subjects' shopping experience. And, while some criticise the use of student samples as compromising external validity (Lynch, 1982), Calder, Phillips, and Tybout (1982) suggest that this is should not be a concern. For instance, research by Baker, Grewal, and Levy (1992) as well as Kaltechva and Weitz (2006) indicates that the use of student samples in the area studied is appropriate.

As far as the sampling plan and procedure are concerned, non-probability sampling in the form of convenience sampling was employed. This type of sampling collects all the cases that fit a particular criterion based on the judgement of experts (two faculty members actively researching in the area functioned as experts). It can also enlist the expertise of past studies and draw on the sampling information this established research provides.

The unit of analysis can be defined as the unit of measurement (frame of reference) employed to enable comparisons that can be used in research to determine how variables are measured (Neuman, 2003). The unit of analysis for this particular research was an individual shopper who more or less frequently purchases in a physical retail store of medium size. Given that retail settings are complex environments that might possess next to design stimuli ambient and social stimuli, which can influence a customer's behaviour, an attempt was made to expose the unit only to design elements, such as floor pattern, shelf height, and aisle width.

4.4 Ethical Considerations

Since the research involves students as subjects, this experimental research followed Research Ethics Guidelines laid out by the University of Bath. The subjects participated on a voluntary basis in this project. The studies did not place the respondents in any physical discomfort, physical harm, deceptive situation, or unpleasant condition. The information gathered from the students is kept confidential and used in aggregate form only. Participating outside institutions and subjects were briefed about the nature of the research in an accompanying cover letter as well as through a short abstract in the beginning of each questionnaire. Furthermore, local ethical regulations of the respective outside institutions were observed throughout the entire research process by applying widely accepted research procedures and adhering to generally agreed-upon research standards.

The ethical issues associated with this form of quantitative research can be assigned to one of three research stages: pre, during, and post research. At the pre-research stage the issues that emerge are that the investigator should reveal his true identity and obtain informed consent when subjects are put at risk (Phoenix, 2006); additional precautions have to be taken for vulnerable populations (e.g., minors, disabled people, sick people). The

researcher should not use vague language in informed-consent forms or fall prey to careless behaviour and not seek informed consent at all (Gray, 2005). In the spirit of good research the investigator should not withhold information concerning the project in order to increase the willingness of the subjects to participate and should not neglect to tell the respondents "how" and "why" the experiment is conducted (Gray, 2005). Overall, since the subjects in this research effort were students, it was conveyed to them that their participation was voluntary in nature.

During the research some widely recognised red flags are deceptive techniques, incentives, and exploiting vulnerable situations. Misleading people in research situations is a grey area and should be overseen by the appropriate experts and regulated by the applicable codes of ethics. Providing incentives is a very controversial topic that divides the research community (Camerer, 1999). While one camp of researchers argues that they skew the results (because the research subjects are bribed), the other camp advances that, if administered properly, they can be a very powerful tool. However, in this research no incentives were provided to encourage response. No vulnerable situations occurred during the experiments.

In the post-research stage, very worrisome issues are breaking confidentiality and not giving the subject control over data. Breaking confidentiality is not only unethical but also against the law and can result in severe legal penalties. In addition, subjects should be allowed to decide whether sensitive research findings should be included in the research report (Phoenix, 2006). Another post-research ethics issue that should be considered is the misinterpretation of data (Neuman, 2003). Positive research relies heavily on an interplay between theorizing and hypothesizing. This in turn defines fairly structured avenues of interpretation. However, since statistical analysis is involved, it also provides room for data misinterpretation. Thus, caution and objectivity should be observed when analysing the findings.

In summary, it has to be reiterated that this project did not expose the subjects to any discomfort nor physical, psychological, or social risk. The respondents of this project were not informed about the manipulations in the various shopping environments; however, since the manipulations were not out of the ordinary but were things commonly experienced in everyday life, these treatments do not provide discomfort or pose any risk to the respondents. The information gathered from the subjects has been and will continue to be kept confidential and used in aggregate form only.

4.5 Stimulus Materials - Pictures

Academic studies use various research methods to do research on shopping behaviour and its atmospheric tenets. In this respect, a number of the more prominent academic research studies gravitate towards employing a paper-and-pencil questionnaire as a research instrument. The paper-and-pencil approach used in conjunction with an actual retail environment was the design that served as the method for Donovan and Rossiter's (1982) classic study on store atmosphere. The respondents in this study were asked to visit different retail environments at different times and record their observations on a questionnaire utilising a rating scale. A technologically more sophisticated approach was employed by Grewal and Baker (1994) when they used videotaped versions of a renovated retail card and gift store to present different experimental treatments in their study on retail store environments. An extension of the videotape-method are virtual walkthroughs, which is a relatively unexplored method in the area of atmospherics. An even more elaborate approach, as reported by Baker, Grewal, and Levy (1992), is the construction of lab or prototype stores to assess the customer acceptance of a modified or new store design.

There are several advantages associated with these methodologies. The paper-and-pencil design and video method are relatively inexpensive. In case of videotapes the technology is simple to employ; also, some

environmental manipulations can be made after the recording has taken place (Baker, Grewal & Levy, 1992). Computer-generated walkthroughs enjoy, to a certain degree, design flexibility and environmental controllability. When lab stores are used, subjects are exposed to a physical shopping environment in a controlled manner, which can be an involving experience for the research subjects. However, these methodologies also possess several weaknesses. With paper-and-pencil and video recordings the subjects could have been exposed to pricing information prior to the actual research or could harbour preconceived notions about a specific store. Another key shortcoming is the fact that researchers must often wait for an opportunity to present itself. Virtual walkthroughs can be relatively complex to create, (not photo realistic) and there is hardly any (literary) evidence that this method either works or is robust enough to survive different implementations. Taking a closer look at lab stores, this methodology produces mostly proprietary results (owned by companies) due to its expensive (Baker, Grewal & Levy, 1992), difficult, and time-consuming nature.

Photographic images or slides have also been employed as a technique for studying store environments and were used in study 1 of this thesis as stimulus material. This technique has been the domain of researchers in various academic disciplines including environmental psychology and marketing for a number of years. It is an inexpensive, easy to manipulate and operationalize, and not very time-intensive method which is within the reach of the ordinary researcher (and which can be aided by computer design). Zeisel (1981) noted that environmental psychologists have successfully used a wide range of devices to monitor environment-behaviour interactions, among which the more frequently used were photographs, floorplans and maps. Bell et al. (1996) advances that photographs are being widely used by researchers in environmental psychology and other related fields as a data collection method. Stamps (2004) in her review of 61 studies on mystery, complexity, legibility and coherence reports that many of the studies used slides or photographs as

stimulus material. Among other studies (Bateson & Hui, 1992; Bell et al., 1996; Davis & Ayers, 1975; Hershberger & Cass, 1974; Machleit et al., 2000; Hu & Jasper, 2006; Kaplan, 1973, 1987) support for this approach is provided by Hui and Bateson (1991) who stress that the use of photos and slides can produce effective manipulations and "can adequately represent the environment" (p. 177).

In the same vein, Rompay et al. (2008) mention that such images can be easily and effectively used to operationalize retail design manipulations. Thus, Study 1 of this thesis used photographic images as stimulus material. Some of the characteristics of this methodology include: flexible design (minimizing the reliance on real-world research constraints and informed consent from research venue owners); environmental controllability (controlling the independent variables); and ease of access and use (enabling an inexpensive material acquisition and simple production process). However, as with all research design techniques, this tool is not without some flaws. It is sometimes not easy to avoid confounds with the given technique. In addition, compared to prototype stores, this approach is limited to two-dimensions and lacks a certain degree of realism.

This project used a number of specifically designed pictures and employed them to operationalize the different treatments. A panel of 5 retail experts from academe, the retail design industry, and graphic design service providers, as exemplified by Kaplan (1973, 1987), was employed to verify the suitability of the images chosen for the given research. This selection process was undertaken to assure professionalism of the approach and avoid possible confounds in corresponding store scenes, such as varying shelf heights.

Eight environments were created with the selected images and embedded in a questionnaire. Each of the environmental designs represented a different manipulation. These manipulations, which concern aisle width, shelf height, and floor pattern, used the following design extremes: wide

versus narrow, high versus low, simple versus complex. The environmental extremes can be realised by, amongst others, photographically enhancing fixtures, positioning departments, and placing equipment; the photographic primes that were used in this research can be viewed in Appendix A1. These store design features are chosen for the experimental study because they are mentioned, used and/or referenced in the applicable literature, which suggests that they should be useful for the research at hand (e.g., controllable, easy to manipulate) (Baker et al., 1992; Berman & Evans, 1995; Bitner, 1992; Grewal & Baker, 1994; Rich & Portis, 1964; Titus & Everett, 1995; Turley & Milliman, 2000; Vrechopoulos et al, 2004).

The actual data collection took place in big classrooms. A random assignment of the manipulations to groups of research subjects was applied, exposing these subjects to one of eight combinations of the three aforementioned design treatments (aisle width, shelf height, floor pattern). The treatments were presented on a questionnaire as photographs, and then the subjects were asked to respond on paper to the questionnaire. Prior to exposing the subjects to a combination of the three design treatments, an additional separation was undertaken by manipulating the individual subjects via a short intro on why the respondents were going shopping. The short intro presented each treatment group in writing either with a hedonic or utilitarian shopping orientation scenario and, then, asked the group members to record their responses on the questionnaire.

As far as the priming of the hedonic/utilitarian treatments are concerned, these manipulations were chosen from existing literature in order to provide effective treatments. Recent studies in the *Journal of Marketing Research* (Berger and Fitzsimons 2008), *Journal of Consumer Psychology* (Dijksterhuis et al., 2005), and *Journal of Personality and Social Psychology* (Bargh, et al., 2001) have acknowledged that (consumer) behaviour can be effectively researched by using primes (cues) in experiments. The hedonic and utilitarian primes for this research were selected in slightly modified form from the Kaltechva and Weitz (2006)

study. Kaltechva and Weitz (2006) employed lines such as "All you want to do in the store is find one or more suitable T-shirts for your (camping) trip and leave" (p.111) to prime an utilitarian shopping experience or "You feel very, very bored. You decide to visit some stores to relieve the sense of boredom" (p.111) to prime a hedonic shopping experience. This thesis research utilised similar primes to create the desired shopping orientations, which are detailed in Appendix A1.

4.6 Stimulus Materials – Virtual Environment

Computer-Aided Design (CAD) has also been suggested as a technique for studying store environments. Historically, CAD techniques have been the domain of architects, engineers and professional designers, due to the steep learning curve and complexity of CAD software. Furthermore, the expense and time commitment associated with professional CAD software precluded its use by most academic researchers in the past. However, Baker et al. (1992) advance that Computer-Aided Design is a "relatively new method of exploring environmental design that shows great promise for future research as computer software becomes more readily available. Researchers can maintain the realistic strength of the videotapes, yet the experimental manipulations can be achieved with greater ease" (p. 457). Among other studies (Griffith, Krampf, & Palmer 2001; Koufaris et al., 2001/2002; Lohse & Spiller, 1999; Wu, 1999), support for this approach is provided by Fiore, Jin, and Kim (2005), who stress that the use of interactive elements can be an effective way to test consumer attitude and behaviour. Fiore, Jin, and Kim (2005) argue that image interactivity "provides the ability to create and manipulate images of a product or environment on a Web site" (p. 673).

Thus, the research problems presented in the preceding paragraphs encourage the testing a of new research approach. What is needed is a methodology that possesses the following characteristics:

1. Flexible design (minimizing the reliance on real-world research opportunities and informed consent from research venue owners)
2. Environmental controllability (controlling the independent variables)
3. Isolated or combined study of measures (isolating particular variables or combining measures and studying their coalescent impact)
4. Ease of access and use (enabling an inexpensive technology acquisition and simple design process)

This project chose among a number of easy-to-use (design) software products for comparison purposes and to enable an efficient operationalization. The software product used had to possess the aforementioned properties.

The applicable software package was selected through an evaluation rubric. The rubric assigned the products to one of three different software categories to be able to determine characteristics such as ease of use, cost, and training commitment. The rubric can be viewed in Appendix A7. The three categories of the rubric are defined as follows:

1. *Specialist applications* (professional architectural software for specialized design projects) (e.g., AutoCAD, ShelfLogic Planogram Software)
2. *Semi-professional applications* (software for professionals as well as amateur computer users) (e.g., Adobe Atmosphere, Google SketchUp)
3. *Consumer applications* (amateur computer applications which are readily available) (e.g., Better Homes and Gardens Interior Designer, Total 3D Home)

As mentioned previously, the effectiveness of the virtual manipulations was tested through experimental design. Eight artificial environments were created with the selected software package, *Better Homes and Gardens* -

Interior Designer, representing a 2x2x2 design without neglecting the dimension of shopping orientation (2x2x2x2 design). Classrooms with big projection screens were chosen to make the demonstration of the environments as realistic as possible. The participants were ushered into the rooms. Prior to exposing the subjects to a combination of the three design treatments, an additional separation was undertaken by manipulating the individual subjects via a short intro on why the respondents were going shopping. The short intro presented each treatment group in writing either with a hedonic or utilitarian shopping orientation scenario. Then each group of participants (cell) with 20 students was asked to view one computer-generated shopping environment in form of a guided walk-through on the projection screen for 65 seconds and then to record their responses on a questionnaire. The shopping environments were left stark (no products were placed in the environments) so that the respondents would not infer that the environments would be a representation of any specific retailer. The virtual shopping environments that were used can be viewed in Appendix A2.

When comparing photographic images to virtual environments, one will find that "the limited research to date indicates that parameters of computer visualizations may significantly affect observers' perceptions, understandings and evaluations" (Daniel & Meitner, 2001, p. 64). Several studies have confirmed that digital video images of high resolution produce perceptual judgements that closely correspond with those produced by colour slides/photographs (e.g. Bishop & Leahy, 1989; Vining & Orland, 1989). For instance, Bishop and Rohrmann (2003) found that simple colour contrast perceptions can be adequately supported by low resolution digital images. Oh (1994) found in his study that average confidence ratings were lowest for computerized environments and highest for digitized and actual photographs. However, in the end Oh (1994) came to the conclusion that "accurate and realistic computer simulations can play a pivotal role as communication tools" (p. 214). In a more relevant experiment, Bergen et al. (1995) compared scenic beauty ratings based on photographs with ratings

based on computer generated perspective views. Overall, Bergen et al. (1995) concluded that the computer generated images might be useful for preliminary assessments of environments, but that "final visual quality assessment would be [best] based on photographic images" (p. 145). Daniel and Meitner (2001) found that both photographic and computer generated visualizations may be sufficient for more abstract representations for responses based on more cognitive processes, such as wayfinding or the development of cognitive maps. Overall, it seems, based on the limited research available, that computer visualizations can provide valid representations for an environment's quality assessments.

After thoroughly reviewing the existing literature and designing the methods for this research, the following table (Table 4.3), that compares the photographic and computer rendered approaches, could be constructed (Bergen et al., 1995):

Table 4.2 Comparison of Photographic and Computer Rendered Visualizations

Characteristic	Photographic Images	Virtual Environment
Variety and Texture (Bergen et al., 1995)	Level of authenticity for the reproduction of environmental qualities much higher	Level of authenticity for the reproduction of environmental qualities lower
Foreground Elements (Bergen et al., 1995)	Hard to determine	Hard to determine
Environmental Conditions (Bergen et al., 1995)	Photographs are preferred to portray environmental conditions	Virtual environments are less favoured to portray environmental conditions
Different Observers (Bergen et al., 1995)	Can simulate fewer visual elements	Can simulate more visual elements
Stimulus Features (Bishop & Rohrmann, 2003)	Can simulate fewer visual elements	Can simulate more visual elements
Appraisal of Content (Bishop & Rohrmann, 2003)	Depends on the observer and purchase-decision context	Depends on the observer and purchase-decision context
Retention (Bishop & Rohrmann, 2003)	More detailed retention	Less detailed retention
Comprehension (Bishop & Rohrmann, 2003)	Provide less information to comprehend the environment	Provide more information to comprehend the environment
Evaluation of Realism (Bishop & Rohrmann, 2003)	More photorealistic	Less photorealistic
Social Interaction (Reeves & Nass, 1996)	No social interaction possible	Limited social interaction with the computer (Computer as a Social Actor Theory) or with the environment possible
Technological Acceptance (Van der Heijden, 2004)	Less technologically sophisticated	More technologically sophisticated

Research Controllability (Malhorta & Birks, 2007)	Less controllable research (e.g., manipulations more complicated to realise)	More controllable research (e.g., manipulations less complicated to realise)

4.7 Measurement Scales

Different measures were employed in this research. For some of the constructs of this thesis, such as shelf height, aisle width, and floor pattern, it was necessary to develop new measures; for this task, it was decided to employ the construct definition procedure suggested by Rossiter (2002); otherwise, the standard scale development process as outlined by Churchill (1979) was employed . The following is information on the measurement scales used for this research.

Shelf Height and Aisle Width

After surveying the applicable literature, no adequate measures could be found that related to shelf height and aisle width. Thus, as a starting point Titus and Everett in their 1995 conceptual paper advance the following proposition: "Retail environments that restrict the shopper's field of vision (e.g., excessively high shelving) will be perceived as less legible and more stimulating then shopping environments with less restrictive visibility (e.g., low shelving)" (p. 110). Bitner (1992) suggests that the size, shape, and arrangement of the equipment used in retail environments and the spatial relationships among them are important to facilitate the consumer performance (e.g., purchasing) and consumer goal accomplishment (e.g., having a good time while shopping). Although certain minimum dimensions are suggested, such us that the aisle width in a retail store should be 1980mm for main and 990mm for subsidiary aisles (Pickard, 2002), both the retailing and architectural literature fall short of providing definitions for the constructs at hand. (The Webster Dictionary or geometry texts have to be consulted in order to attain general definitions for width and height.) To generate these measures the procedure developed by Rossiter (2002) was followed. In this context, the measurement task at hand is to ascertain how

a consumer (rater) perceives shelf height/aisle width (attribute) in a brick-and-mortar retail environment (object). To conceptually refine the measurement items, an academic retail expert, an experienced retail design practitioner, the applicable retail design literature, and the Thesaurus were consulted. With these clarifications in mind, the following 7-point Likert scale questions were employed to realise shelf height and aisle width as measurement items: *Shelf Height* – (1) This store has high shelves; (2) It would be hard for most people to get items from the top shelf without a ladder; (3) The height of the shelves in this store would block my ability to see the rest of the store. *Aisle Width* - (1) This store has wide aisles; (2) There is room for two or more shopping carts next to each other in this aisle; (3) There is plenty of room between these shelves;

Floor Pattern

Titus and Everett (1995) propose that, "Shopping environments possessing symmetrical design properties (e.g., grid aisle patterns, orthogonal path angles) will be perceived as more legible and less stimulating than environments containing more asymmetrical design properties" (p. 109). Vrechopoulos et al. (2004), supported by Levy and Weitz's (2001) work, define gird layout as "a rectangular arrangement of displays and long aisles that generally run parallel to one another" (p. 14) and racetrack layout as an organisation of the sales floor "into individual, semi-separate areas" which lead "the customer along specific paths to visit as many store sections or departments as possible" (p. 14). To create the measure, Rossiter's (2002) procedure was used again. In essence, the measurement goal here is to determine how a consumer (rater) perceives the floor pattern (attribute) of a store (object). To conceptually refine the measurement items, an academic retail expert (who taught and consulted on retailing and visual merchandising for over 20 years), an experienced retail design practitioner (who designed retail spaces for Marks & Spencer), the applicable retail design literature, and the Thesaurus were consulted. To realise the floor pattern measure the following statements using a 7-point Likert scale were include in the questionnaire: (1) To find items in this

store would be easy; (2) It would be easy to find my way through this store; (3) The aisles in this store are laid out in a simple manner.

Legibility

Weisman (1981) defines the construct of legibility as an important component that facilitates the process of wayfinding. Titus and Everett (1995) and Dogu and Erkip (2000) suggested the use of Weisman's (1981) research on legibility. Weisman employed 10 items in his questionnaire that were related to wayfinding behaviour and the understanding of specific environments, both of which are important to help build a cognitive wayfinding guide (cognitive map). This approach is in line with Kaplan's (1987) and O'Neill's (1991) view that a cognitive map is an important influencer of someone's legibility performance (wayfinding performance). Some of Weisman's questionnaire items were also used in Dogu and Erkip's (2000) study on factors that affect wayfinding behaviour in shopping malls. Although Dogu and Erkip slightly modified the legibility items to fit their researcher needs, it turned out that the item possess sufficient reliability and validity. Based on the questionnaire employed by Weisman (1981) and only a number of these items being really applicable to the legibility measure at hand, the following four items were used in this thesis research in slightly modified form and scored on a 7-point scale to build the legibility measure: (1) I have no trouble finding my way in this store; (2) I would be able to direct a shopper who has never been to this store to a certain location (e.g., cash registers, exit) in this store; (3) I would be confident of the directions I give to the shopper who has never been to the store; (4) In general, I do find this store relatively easy to 'figure out.'

Tangible Service Quality Perception

Parasuraman, Zeithaml, and Berry (1986, 1988) define perceived service quality as the difference between a consumer's perceptions and expectations. Their corresponding scale, the SERVQUAL scale, consists of 22 items which evaluate, first, the expectations for specific service industry and, then, the perceptions about a specific service provider. The items are

separated into five service dimensions (subscales) which relate to the tangibility, reliability, responsiveness, assurance, and empathy of service. The items use a 7-point bipolar scale which ranges from strongly 1 (disagree) to 7 (strongly agree), and approximately half of the items are reversed. Parasuraman, Zeithaml, and Berry (1988) reported for the study that tested the scale acceptable coefficient alpha values for both the factors and the total scale (ranging from 0.87 to 0.90).

The scale's usefulness was illustrated by Dabholkar, Thorpe, and Rentz (1996) who used a modified version of the original SERVQUAL scale for determining the level of service quality in the retail industry. This scale employed 28 items and used the original five service dimensions and three new subdimensions. The expectations and perceptions of customers were assessed on 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The reliability values for the dimensions and subdimensions ranged from 0.81 to 0.92. The authors reported that they were able to establish sufficient discriminant and predictive validity.

Over the years, critique arose as to the ability of the perception-expectation dichotomy by Parasuraman et al. (1988) to directly measure service quality. Cronin and Taylor (1992), Brown et al. (1993), Teas (1993, 1994), Buttle (1996) and Brady et al. (2002) voiced concerns about the validity of the SERVQUAL scale based on the theory surrounding this instrument. Following up on their critique, Cronin and Taylor (1992) developed a unidimensional version of the Scale, which was based purely on performance and was called SERVPERF. The Cronin and Taylor version simply uses the perception items of the original SERVQUAL scale to measure service quality and reports reliability values for sample-studies ranging from 0.88 to 0.96. Supporting these concerns about the usefulness of expectations and gap-scores is research by Iacobucci et al. (1994), Smith (1995), and Van Dyke et al. (1997). Even Parasuraman, Zeithaml, and Berry (1994a) concede that performance-focused measures of service quality seemed to be more precise in predicting overall quality.

Babakus and Boller (1992) provided additional support for the performance-only approach by arguing:

> (...) when people are asked to indicate a "desired level" and "existing level" on a particular attribute, a number of psychological constraints may be activated to make the resulting deficiency scores problematic (cf., Cronbach and Furby, 1970; Wall and Payne, 1973). For example, when people concurrently respond to "what is desirable" and "how much is there now," they seldom rate the former lower than the latter (Wall and Payne, 1973).
> (p. 256)

Since this research is interested in the perceptions/performance (service performed by the retail environment) and takes the validity (Cronin & Taylor, 1992; Brown et al., 1993; Teas, 1993, 1994) and expectation-perception gap usefulness (Iacobucci et al. 1994, Van Dyke et al. 1997) concerns of the original SERVQUAL scale into consideration, it incorporates elements of the unidimensional Cronin and Taylor (1992) and Babakus (1992) versions of the SERVQUAL scale. In one of the studies which applied a unidimensional construct, Karatepe, Yavas, and Babakus (2005) transformed the service quality items on their perception-only scale into Likert-scales on which the respondents were asked to indicate their perceptions of the service their bank provides using a five-point scale ranging from "5 = strongly agree" to "1 = strongly disagree" (reliabilities of 0.81 to 0.92 were reported).

The statements of the original tangibility dimension in the SERVQUAL scale (Parasuraman, Zeithaml, and Berry 1988) were placed in the context of the unidimensional Cronin and Taylor (1992)/ Karatepe, Yavas, and Babakus (2005) version of the Scale and rephrased as follows and measured on a 7-point scale to fit the given research: (1) The store has very modern-looking equipment and fixtures; (2) The physical facilities at

this store are visually appealing; (3) This store is well designed and appears neat; (4) The appearance of the physical facilities of the store is keeping with the type of services provided.

Arousal, Pleasantness, and Shopping Orientation

The original Mehrabian and Russell (1974) scale, used by Donovan and Rossiter (1982), Baker et al. (1992) and others, served as the basis for the arousal and pleasantness measures employed by Kaltechva and Weitz (2006). Arousal was measured using a nine-point, 4-item semantic differential scale with reliabilities values ranging from 0.86 to 0.91. Pleasantness was measured on a nine-point, 6-item semantic differential scale with alpha values of 0.78 to 0.89. Furthermore, Kaltechva and Weitz developed their own 4-item scale for the motivational orientation measure. The psychometric properties of the measures were assessed with confirmatory factory analysis. The authors report coefficient alpha values between 0.81 and 0.90. Kaltechva and Weitz used the Anderson and Gerbing (1988) and Fornell and Larcker (1981) methods to examine the discriminant validity of the measures. For both methods all measures showed discriminant validity. This thesis research used the arousal, pleasantness and motivational orientation scales as they were provided by Kaltechva and Weitz (2006). For further details about the scales, please consult Appendix A6.

Repeat Patronage Intention

Repeat patronage of retail stores is an important and often used construct in marketing. In this context, Zeithaml et al. (1996) associated the construct of repeat patronage intention with intentions, such as preferring one store over the other, repeatedly purchasing from this store, and doing more business with this retail establishment in the future. For the purpose of this study a 7-point semantic differential scale used by Wakefield and Baker (1998) was employed. The scale possesses four items. Wakefield and Baker (1998) report that this scale they used in their study produced acceptable alpha values ranging from 0.73 to 0.97. A similar scale was

previously used by Oliver and Swan (1989), who reported equally successful results with high reliability readings (ranging from 0.83 to 0.96). In the same spirit, four items were used in this research to measure repeat patronage intentions. Each of the items was scored on a 7-point semantic differential scale. The four opposing adjectives used to measure the items included (Wakefield and Baker 1998, p.524): "In the future, my shopping at this store will be..." not at all-very frequent, unlikely-likely, not probable-very probable, and impossible-very possible.

Summary of Measures

All measurement items were scored on a 7-point Likert-type scale, except the items for arousal and pleasantness, which were measured on a semantic differential scale. The questionnaire items for the two main studies were randomized, resulting into four randomized versions of the questionnaire. A copy of the questionnaire used for the main studies has been included in Appendix A4. Following is Table 4.3, which is a summary of the measures used.

Table 4.3 Summary of Measures:

Measure	Description	Source	Final Item in Instrument
Shelf Height	This store has high shelves.	Academic Expert*, Retail Expert**, Thesaurus, In-depth Interviews***, Seminar Feedback	This store has high shelves.
	It would be hard for most people to get items from the top shelf without a ladder. (Top-shelf items can only be reached when a ladder is used)	Academic Expert, Retail Expert, Thesaurus, In-depth Interviews, Seminar Feedback	It would be hard for most people to get items from the top shelf without a ladder.
	The height of the shelves in this store would block my ability to see the rest of the store. (Seeing through the environment is not possible due to high shelves)	Academic Expert, Retail Expert, Thesaurus, In-depth Interviews, Seminar Feedback	The height of the shelves in this store would block my ability to see the rest of the store.
Aisle Width	This store has wide aisles.	Academic Expert, Retail Expert, Thesaurus, In-depth Interviews, Seminar Feedback	This store has wide aisles.
	There is room for two or more shopping carts next to each other in this aisle. (Small aisle should be at least 3 foot wide. A shopping cart is at least 2 foot wide. Thus, 2 more shopping cards signal a wide aisle.)	Academic Expert, Retail Expert, Thesaurus, In-depth Interviews, Seminar Feedback	There is room for two or more shopping carts next to each other in this aisle.
	There is plenty of room between these	Academic Expert, Retail	There is plenty of room between these

	shelves.	Expert, Thesaurus, In-depth Interviews, Seminar Feedback	shelves.
Floor Pattern	To find items in this store would be easy. (Navigations skills of consumers are challenged)	Academic Expert, Retail Expert, Thesaurus, In-depth Interviews	To find items in this store would be easy.
	It would be easy to find my way through this store. (Navigations skills of consumers are challenged)	Academic Expert, Retail Expert, Baker et al. (1992), In-depth Interviews	It would be easy to find my way through this store.
	The aisles in this store are laid out in a simple manner	Academic Expert, Retailing Expert, Thesaurus, In-depth Interviews	The aisles in this store are laid out in a simple manner.
Legibility	Have you ever had trouble finding your way or gotten lost inside of this building?	Weisman (1981)	I have no trouble finding my way in this store.
	Do you think you'd be able direct a stranger to many places (e.g., classrooms, stairways, exits), inside this building?	Weisman (1981)	I would be able to direct a shopper who has never been to this store to a certain location (e.g., cash registers, exit) in this store.
	How confident would you be of the directions you'd give to such a stranger?	Weisman (1981)	I would be confident of the directions I give to the shopper who has never been to the store.
	All things considered, do you find this building a relatively easy or a relatively difficult place to 'figure out' and in which to find your way?	Weisman (1981)	In general, I do find this store relatively easy to 'figure out.'

Tangible Service Quality	XYZ has up-to-date equipment.	Parasuraman, Zeithaml, and Berry (1988)	The store has modern-looking equipment and fixtures.
	XYZ's physical facilities should be visually appealing.	Parasuraman, Zeithaml, and Berry (1988)	The physical facilities at this store are visually appealing.
	XYZ's employees should be well dressed and appear neat.	Parasuraman, Zeithaml, and Berry (1988)	This store is well designed and appears neat.
	The appearance of the physical facilities of XYZ is in keeping with the type of service provided.	Parasuraman, Zeithaml, and Berry (1988)	The appearance of the physical facilities of the store is keeping with the type of services provided.
Pleasantness	In this store, I would feel: Displeased versus pleased; satisfied versus dissatisfied (reversed); pleasant versus unpleasant (reversed); unhappy versus happy. (Scored on a nine-point semantic differential scale)	Mehrabian and Russell (1974), Kaltechva and Weitz (2006)	In this store, I feel: Displeased versus pleased; satisfied versus dissatisfied (reversed); pleasant versus unpleasant (reversed); unhappy versus happy. (Scored on a seven-point semantic differential scale)
Arousal	In this store, I would feel: Relaxed versus stimulated; excited versus calm (reversed); frenzied versus sluggish (reversed); dull versus jittery; wide awake versus sleepy (reversed); unaroused versus aroused. (Scored on a nine-point semantic differential scale)	Mehrabian and Russell (1974), Kaltechva and Weitz (2006)	In this store, I feel: Relaxed versus stimulated; excited versus calm (reversed); frenzied versus sluggish (reversed); dull versus jittery; wide awake versus sleepy (reversed); unaroused versus aroused. (Scored on a seven-point semantic differential scale)
Shopping Orientation	In the store, I primarily wanted: To have fun; to get things done (reversed); to be task focused (reversed); to relieve boredom. (Scored on a nine-	Mehrabian and Russell (1974), Kaltechva and Weitz (2006)	In the store, I primarily want: To have fun; to get things done (reversed); to be task focused (reversed); to relieve boredom. (Scored on a seven-

	point Likert scale, anchored by "strongly disagree" to "strongly agree")		point Likert scale, anchored by "disagree" to "agree")
Repeat Patronage Intention	In the future, my shopping at this mall will be: • not at all-very frequent • unlikely-likely • not probable-very probable • impossible-very possible (Scored on a seven-point semantic differential scale)	Wakefield and Baker (1998)	In the future, my shopping at this store will be: • not at all-very frequent • unlikely-likely • not probable-very probable • impossible-very possible (Scored on a seven-point semantic differential scale)

* Academic expert (University professor who taught and consulted on retailing and visual merchandising for over 20 years)
** Retail design expert (Retail practitioner who designed retail spaces for Marks & Spencer)
*** interviews (interviews were conducted in the context of construct definition and scale development)

4.8 Pretest

Evaluation of Measures

Before conducting the main experiments, a pretest was employed to assess the research participants' environmental perceptions of a store environment. A sample consisting of 46 students was used. Eight conditions with appropriate store pictures were used in a 2 (shelf: high vs. low) x 2 (aisle: wide vs. narrow) x 2 (floor pattern: simple vs. complex) design. One group of 23 pretest subjects was exposed to 4 conditions, whereas the other group of 23 subjects was exposed the other four conditions. After viewing each condition, the respondents completed a questionnaire that corresponded to the applicable condition. A copy of the questionnaire used for the pretest has been posted in Appendix A5.

The measures to assess the manipulations included shelf height, aisle width, and floor pattern (single-item). The dependent measures employed

in the pretest were coherence (Kaplan, 1973), legibility (Weismann, 1981), and perceived spatial crowding (Machleit, Kellaris, & Eroglu, 1994). All scales for the applicable items showed Cronbach's alpha coefficients ranging from 0.76 to 0.95, which is beyond 0.7 (Nunnally, 1978). Thus, these items appeared to demonstrate sufficient internal reliability (see Tables 4.4).

Table 4.4: Pretest Cronbach's Alpha Values

Measures	No. of Items	Cronbach's Alpha	No. of Factors
Coherence	4	0.86	1
Legibility	4	0.95	1
Perceived Spatial Crowding	4	0.76	1

Manipulation Check

Shelf height, aisle width, and floor pattern were employed to assess whether the manipulations of the three environmental factors reached the intended levels. Analysis of variance was used to check the manipulations of the pretest. As illustrated in Table 4.3, all manipulations were successful and seemed to have been perceived as intended. The analysis of variance for shelf height indicated that the difference between the high-shelf and low-shelf conditions was statistically significant beyond a p-value of 0.001. As can be seen in Table 4.6, the analyses of variance for the aisle width and floor pattern conditions produced also significant results with p-values smaller than 0.001. It can be concluded that these manipulations are suitable to be used in the main studies.

Table 4.5: Pretest Manipulation Check

Manipulation Check Factors	Mean Values		F-Value	p-value
	High	**Low**		
Shelf Height	6.21	3.93	108.54	$p < 0.001$
	Wide	**Narrow**		
Aisle Width	4.56	3.51	11.63	$p < 0.001$
	Simple	**Complex**		
Floor Pattern	5.16	3.94	25.86	$p < 0.001$

4.9 Summary

This chapter discussed the research design of this thesis, outlining the 2x2x2x2 between-subjects experimental design (factors: shopping orientation, shelf height, aisle width, and floor pattern) to test the proposed model. In addition, Chapter 4 explained that convenience sampling was used and 640 undergraduate and graduate students from various universities were part of the main research. Third, the ethical issues concerning this project were examined and discussed in detail. Fourth, photographic images used for Study 1 and virtual environments used for Study 2 were critiqued and justified. Fifth, the measurement scales chosen for the paper-and-pencil questionnaire were introduced and their characteristics discussed. Once the manipulations and scales were in place, the results of a pretest were presented, which confirmed that the selected manipulations (shelf height, aisle width, and floor pattern) were acceptable for the main studies and that the scale alpha coefficients were

adequate. Chapter 5 provides the characteristics of the main sample and the results of the hypothesis testing for Studies 1 and 2.

CHAPTER V
ANALYSIS OF THE FINDINGS

5.1 Introduction

The following chapter presents the characteristics of the main-study sample and the outcome of the testing of the eight hypotheses that were advanced in each of the two studies. A summary of the hypothesis framework employed is provided in the beginning of each of the result analysis sections for the two studies.

5.2 Characteristics of the Main-Study Sample

A total of 663 undergraduate and graduate students from four universities participated in the two experiments. Out of these 663 respondents, 640 valid questionnaires were subjected to statistical analysis for this research. Considering each of the two studies, the manipulations were randomly assigned to one of sixteen different treatment groups, with each condition generating 20 responses. The sample consisted of 241 male and 396 female students, or a male to female ratio of 38% to 61%, respectively; 3 students or 1% did not specify their gender. The age of the majority of the students, 534 (83%), ranged from 18 and 25 years. A smaller number of participants, 76 (12%), were older than the typical college student and could be assigned to the 26 to 40-year age category. Thirty (5%) students did not reply to the age question as illustrated in Table 5.1.

As far as the frequency of shopping in a physical store is concerned, 5% indicated on the questionnaire that they shop every day in a physical store. 10% stated that they buy 5 times a week in a brick-and-mortar store. The majority, however, revealed that they shop about 3 times a week or once a week, which translates into 26% and 35% of the total number of respondents, respectively. Smaller fractions of the students questioned

replied that they shop only twice a month (14%) or once a month (8%) in a physical store. No subject indicated that he/she "never" engages in shopping in a store. Two percent of the respondents asked did not provide an answer to this question. Please see Table 5.1 for a summary of the characteristics of the experimental sample.

Table 5.1 Characteristics of the Experimental Sample

	STUDY 1		**STUDY 2**	
Sample Characteristic	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Gender Total	320	100	320	100
Male	131	41	110	35
Female	187	58	209	64
No Response	2	1	1	1
Age Total	320	100	320	100
18	46	14	8	2
19	54	17	26	8
20	56	18	49	15
21	40	13	54	17
22	30	9	50	16
23	14	4	50	16
24	7	2	24	8
25	10	3	16	5
26 and above	42	13	34	10
No Response	21	7	9	3
How often shop in physical store Total	320	100	320	100
Every day	3	1	29	9
About 5 times a week	23	7	40	13
About 3 times a week	70	22	96	30
About once a week	111	34	115	36
About twice a month	73	23	22	7
About once a month	35	11	14	4
Never	0	0	0	0
No Response	5	2	4	1

In the upcoming paragraphs the findings of the two main studies are examined; more specifically, the results generated through Study 1 which used photographic images and Study 2 which used virtual environments are examined.

5.3 Results of Study 1

For this study, mean substitution was used for missing data (Hair, Anderson, Tatham, & Black, 1998). This method seeks to replace the missing values by utilising the mean, which has the least impact on the variance in the data. Reasons for missing data in this research might have been respondents' oversight of questions, lack of effort when filling in the survey, or difficulty in making inferences on how to perceive certain constructs (given the limited information available).

In Table 5.2 a summary of the hypotheses framework used for this experimentation is provided.

Table 5.2 Summary of the Hypotheses Framework

Hypothesis	Independent	Dependent	Relationship	Statistical Method
H1(a)	Aisle Width	Legibility	Negative	ANOVA
H1(b)	Shelf Height	Legibility	Positive	ANOVA
H1(c)	Floor Pattern	Legibility	Negative	ANOVA
H2(a)	Aisle Width	Arousal	Positive	ANOVA
H2(b)	Shelf Height	Arousal	Negative	ANOVA
H2(c)	Floor Pattern	Arousal	Positive	ANOVA
H3	Legibility	Tangible Service Qual	Moderation(Ori)	ANOVA
H4	Arousal	Pleasantness	Moderation	ANOVA
H5	Legibility	Repeat Patronage	Mediation(TSQ)	Regression
H6	Pleasantness	Repeat Patronage	Mediation(Plea)	Regression
H7	Tangible Service Qual	Repeat Patronage	Positive	ANOVA
H8	Pleasantness	Repeat Patronage	Positive	ANOVA

5.3.1 Assessment of Measures

Before exploring the hypotheses in more detail, the measures were assessed as to their validity and reliability. A sample consisting of 320 students was used. Sixteen conditions with appropriate store pictures were created to reflect a 2 (shelf: high vs. low) x 2 (aisle: wide vs. narrow) x 2 (floor pattern: simple vs. complex) x 2 (orientation: hedonic vs. utilitarian) design. One group of 20 subjects was exposed to one condition, creating an in-between the subjects design. After viewing the condition, the respondents completed a questionnaire that corresponded to the applicable condition.

The measures to assess the manipulations included shelf height, aisle width, and floor pattern, and shopping orientation. The dependent measures employed were legibility, tangible service quality, arousal, pleasantness, and repeat patronage intention. All variables used are multi-item measures that are unidimensional in nature. The theoretical foundations for each of the measurement constructs were discussed in Chapters 2 and 4, and the scale properties were addressed in the measurement scales section of Chapter 4. The content validity of the various measures employed for this study was established through theories and research studies, which have been presented in earlier chapters.

To test the reliability of the given measures, the Cronbach's alpha value was employed (Cronbach, 1951). All scales for the applicable items showed Cronbach's alpha coefficients ranging from 0.72 to 0.90. Nunnally (1978) suggested that the acceptable minimum reliability for research should be 0.7 or greater. Therefore, these items appear to demonstrate sufficient internal reliability (see Tables 5.3).

In general, to improve the reliabilities of possible deficient scales for the studies, scale purification was undertaken. The process of scale purification requires the elimination of items that do not significantly contribute to the

explained reliability, variance, and validity of the overall measure. To achieve a simple structure through purification, each item should load cleanly onto a single factor and should not be highly correlated with the other factors (Churchill, 1979, Rossiter, 2002). Simple structures also provide evidence of discriminant validity. To ensure purified measures, the measures were evaluated over several iterations through exploratory factor analysis. In the given case, shopping orientation generated with its original number of items a reliability (0.68) which was below Nunnally's 0.7 benchmark. Thus, a removal of items number 1 and 4 of the shopping orientation measure was undertaken, transforming this variable into a two-item measure with adequate reliability/correlation (0.82). As far as the critique of two-item measures is concerned, Drolet and Morrison (2001) support the use of measures with less than three items since many additional items only minimally improve the reliability, whereas existing items can be reversed or differently presented (ordered) in a questionnaire to increase the reliability. Hair et al. (2006) find that scales containing too many items make the scale too complex and often lead to problems in producing evidence for unidimensionality.

In addition to examining the reliabilities of the scales, exploratory factor analysis employing the principle component method was utilised to perform an internal structural analysis for each measure. The variances explained for each factor of each measure ranged from 65% to 80%, thus satisfying the generally recommended 50% benchmark (Hair et al., 1998). In addition, it can be reported that all items loaded onto the appropriate factors. The factor loadings ranged from 0.76 to 0.80. No cross-loadings on other factors of a value greater than 0.40 (Pelsmacker et al., 2008; Tabachnik & Fidell 2001) can be reported for the items examined; Hair et al. (2006) consider loadings below 0.40 as hardly meeting the minimal level for the interpretation of the structure and too low for practical significance. Table 5.3 shows a summary of the assessment of the measures used in this research.

Table 5.3 Summary Table for the Assessment of Measures

Measures	No. of Items	Cronbach's Alpha	No. of Factors
Shelf Height	3	0.86	1
Aisle Width	3	0.74	1
Floor Pattern	3	0.78	1
Shopping Orientation	2	0.82	1
Legibility	4	0.90	1
Tangible Service Quality	4	0.85	1
Arousal	5	0.72	1
Pleasantness	4	0.88	1
Repeat Patronage Intention	4	0.92	1

The primary approach of data analysis for this thesis is analysis of variance. The assumption for this procedure, such as independence, homogeneity of variance, and normality (Hair et al., 2006), were checked. ANOVA is credited with being generally robust enough to overcome violations, especially when good enough samples (n > 200) are employed (Pelsmacker et al., 2008). Besides the assumptions that the observations should be at least interval-scaled, independent, and randomly taken from the population, which were within acceptable parameters for the given study, there are two other assumptions that should be examined: homogeneity of variance and normality. For all measures the results for the Levene's test were not significant, indicating that they fulfilled the assumptions of homogeneity of variance. In addition, the normality assumption should be examined. The measures displayed adequate normality, employing Kolmogorov-Smirnov tests. However, it is also "important to perform a graphic inspection of the normality in addition to the

formal testing" (Pelsmacker et al., 2008, p. 113) using normality plots, such as histograms with normality curves, Q-Q plots, or Box plots. On the basis of the graphic inspection of the normal distributions of these measures it was deemed that normality is substantially present.

5.3.2 Manipulation Check

Shelf height, aisle width, floor pattern and shopping orientation were employed to assess whether the manipulations of the three environmental factors and one psychological factor reached the intended levels. Analysis of variance was used to check the manipulations. As illustrated in Table 5.4, all manipulations were successful and seemed to have been perceived as intended.

The analysis of variance for shelf height indicated that the difference between the high-shelf and low-shelf conditions was statistically significant. The p-value was beyond a level of 0.001 with an F-value 346.43. The mean of high-shelf environments was significantly higher than for the low-shelf environments (M_{high}=5.88 versus M_{low}=3.02) thus confirming that the shelf-manipulation was successful.

The analyses of variance for the aisle width and floor pattern conditions produced similar results. The results for aisle width indicated that this particular manipulation was strong enough with an F-value of 88.42 and a p-value beyond 0.001. The difference between the group means was statistically significant (M_{wide}=5.26 and M_{narrow}=3.83). The results for floor pattern showed that this manipulation was successful as well with an F-value of 32.28 and a p-value beyond 0.001. The mean difference for this particular manipulation check measure generated a statistically significant result (M_{simple}=4.92 versus $M_{complex}$=4.02).

A manipulation check was also performed for the independent measure of shopping orientation. The manipulation was tested through an ANOVA

design. The respondents perceived the manipulation as intended ($M_{utilitarian}$= 3.51 versus $M_{hedonic}$ = 2.32). Hedonic consumers perceive fun-oriented shopping as more pleasurable than utilitarian consumers do, whereas utilitarian consumers perceive task-oriented shopping more pleasurable ($F = 68.89$, $p < 0.001$). It could be concluded that the aforementioned manipulations were suited to be used in this study. Table 5.4 shows the results of the manipulation check.

Table 5.4: Manipulation Check Results

Manipulation Check Factors	**Mean Values**		**F-Value**	**p-value**
	High	**Low**		
Shelf Height	5.88	3.02	346.43	$p < 0.001$
	Wide	**Narrow**		
Aisle Width	5.26	3.83	88.42	$p < 0.001$
	Simple	**Complex**		
Floor Pattern	4.92	4.02	32.28	$p < 0.001$
	Hedonic	**Utilitarian**		
Shopping Orientation	3.51	2.32	68.89	$p < 0.001$

5.4 Results of Hypothesis Testing – Study 1

5.4.1 Independent Variables

Hypothesis One (a), (c) – Supported, Hypothesis One (b) – Not Supported

H1(a): A store environment with low shelves will result in a higher level of legibility than a store environment with high shelves.

H1(b): A store environment with wide aisles will result in a higher level of legibility than a store environment with narrow aisles.

H1(c): A store environment with a simple floor pattern will result in a higher level of legibility than a store environment with a complex floor pattern.

The above mentioned hypotheses relate to the cognitive path of the model proposed in this research. In hypothesis one (a) it was examined whether shelf height has an impact on environmental perceptions. In this context, a similar condition had been tested during the manipulation check of shelf height (high/low). Hypothesis one (a) proposes that shopping environments with low shelves are more legible than shopping environments with high shelves. An analysis of variance (ANOVA) was undertaken to test this difference (Table 5.5). The one-way ANOVA results show that the mean legibility for high-shelf store environments is significantly less than the mean legibility for low-shelf environments ($M_{\text{high height}} = 3.93 < M_{\text{low height}} = 4.58$, $p < 0.001$). Hypothesis one is supported due to the fact that a store environment with low shelves will result in a higher level of legibility than a store environment with high shelves.

Regarding aisle width, hypothesis one (b) investigated the influence of aisle width on environmental legibility. As a matter of fact, a similar condition had been evaluated during the manipulation check of aisle width (wide/narrow). The hypothesis suggests that a store environment with wide aisles will have a higher level of legibility than an environment with narrow aisles. The one-way ANOVA analysis yielded that the mean legibility for wide-aisle environments is not significantly higher than the mean legibility for narrow-aisle environments ($M_{\text{wide aisle}} = 4.27 > M_{\text{narrow aisle}} = 4.25$, $p = 0.935$). As can be seen from the result (Table 5.5), hypothesis one (b) is not supported.

The impact of floor pattern on legibility was examined through hypothesis one (c). Also the floor layout association had been assessed during the manipulation check of floor pattern (simple/complex). For this association,

simple store environments are hypothesized to have a higher level of legibility than complex store environments. The result of the ANOVA (Table 5.5) confirmed this suggested difference, showing that the mean legibility of simple environments is much higher than the mean legibility of complex environments ($M_{\text{simple pattern}} = 4.84 > M_{\text{complex pattern}} = 3.67$, $p < 0.001$). Thus, hypothesis one (c) is supported.

Table 5.5 Results of the ANOVA Analysis for H1(a)-(c)

(a) Shelf Height

Dependent Variable: Legibility

	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	P-Value
Between Groups	33.963	1	33.963	14.809	0.000
Within Groups	729.293	318	2.293		
Total	763.256	319			

(b) Aisle Width

Dependent Variable: Legibility

	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	P-Value
Between Groups	0.016	1	0.016	0.007	0.935
Within Groups	763.240	318	2.400		
Total	763.256	319			

(c) Floor Pattern

Dependent Variable: Legibility

	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	P-Value
Between Groups	109.571	1	109.571	53.303	0.000
Within Groups	653.686	318	2.056		
Total	763.256	319			

Hypothesis Two (a), (b), (c) – Not Supported

H2(a): A store environment with low shelves will result in a lower level of arousal than a store environment with high shelves.

H2(b): A store environment with wide aisles will result in a lower level of arousal than a store environment with narrow aisles.

H2(c): A store environment with a simple floor pattern will result in a lower level of arousal than a store environment with a complex floor pattern.

One-way ANOVAs were employed for the affective path to test the hypothesized differences. The three hypotheses examined whether shelf height/aisle width/floor pattern have significantly different mean levels as proposed in the respective hypotheses (H2(a) to (c)). The variance testing revealed that none of the three hypotheses for arousal were supported (Table 5.6). In other words, the difference-relationships associated with shelf height ($M_{\text{high height}} = 3.90 > M_{\text{low height}} = 3.71$, $p = 0.064$), aisle width ($M_{\text{wide aisle}} = 3.75 < M_{\text{narrow aisle}} = 3.85$, $p = 0.263$) and floor pattern ($M_{\text{simple pattern}} = 3.76 < M_{\text{complex pattern}} = 3.86$, $p = 0.338$) were not statistically significant. Since these hypotheses were not supported, all subsequent hypotheses of this path (including H6) automatically cannot be supported because a precondition for these hypotheses to be considered is that the primes are effective. A possible explanation for this result is that retail design might not stimulate significant enough affective responses in consumers, which might have prompted Baker, Grewal and Levy (1992) and other atmospheric researchers to shy away from research on store design.

Table 5.6 Results of the ANOVA Analysis for H2(a)-(c)

(a) Shelf Height

Dependent Variable: Arousal

	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	P-Value
Between Groups	3.281	1	3.281	3.458	0.064
Within Groups	301.662	318	0.949		
Total	304.942	319			

(b) Aisle Width

Dependent Variable: Arousal

	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	P-Value
Between Groups	1.201	1	1.201	1.257	0.263
Within Groups	303.742	318	0.955		
Total	304.942	319			

(c) Floor Pattern

Dependent Variable: Arousal

	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	P-Value
Between Groups	0.882	1	0.882	0.922	0.338
Within Groups	304.060	318	0.956		
Total	304.942	319			

5.4.2 Moderating Variables

Hypothesis Three – Not Supported

> *H3: The motivational shopping orientation of a consumer moderates the effect of legibility on tangible service quality such that: There is a positive relationship between legibility and tangible service quality perceived by a consumer with a utilitarian motivational orientation. There is a negative relationship between legibility and tangible service quality perceived by a consumer with a hedonic motivational orientation.*

The proposed model employs both moderating and mediating variables. In this context, moderating variables operate as factors according to which the outcome varies, and mediating variables function as a mechanism through which information is processed. Baron and Kenny (1986) suggest the following moderator analysis in cases in which a dichotomous independent variable's (legibility: low/high) effect on the dependent variable (pleasantness) varies as a function of another dichotomy (shopping orientation: hedonic/utilitarian): "The analysis is a 2x2 ANOVA, and a moderation is indicated by an interaction. We may wish to measure the simple effects of the independent variable across the levels of the moderator (Winter, 1971, pp. 435-436), but these should be measured only if the moderator and the independent variable interact to cause the dependent variable" (p. 1175).

In the given case, it was hypothesized that motivational shopping orientation moderates the effect of legibility on tangible service quality. In essence, this hypothesis addresses how the extra motivation provided through a predisposed shopping orientation impacts consumer behaviour. According to Baron and Kenny (1986), a hypothesis concerning moderation

can be accepted when the interaction term (between the independent and moderating variable) is statistically significant. As in the Kaltechva and Weitz's (2006) study, an ANOVA with a 2x2 between-subjects design was used to test the moderating properties of shopping orientation for the cognitive path. Motivational orientation (task/recreational) and legibility (low/high) were used as fixed factors (independent variables), whereas tangible service quality was used as a dependent measure. The median-splitting method was employed to dichotomize legibility, which is a commonly used procedure in the literature (Evanschitzky & Wunderlich, 2006; Voorhees & Brady 2005). The statistical testing yielded (see Table 5.7) that shopping orientation is not a significant moderator between the legibility generated through a store environment on the service quality of the environment ($F(1, 319) = 0.18$, $p = 0.67$). Shopping orientation had no significant main effect on tangible service quality ($F(1, 319) = 1.04$, $p = 0.31$, $M_{task} = 4.10 > M_{rec} = 3.92$). Given the previous results, hypothesis three was rejected, supporting the notion that shopping orientation is an ineffective moderator when used in conjunction with retail design cues this research employees.

Table 5.7 Results of the ANOVA Analysis for H3

Dependent Variable: Tangible Service Quality

Source	Mean Square	F-Value	P-Value
Corrected Model	9.039	4.973	0.002
Intercept	5095.055	2803.315	0.000
Legibility (High/Low Levels)	24.224	13.328	0.000
Shopping Orientation (Hedonic/Utilitarian Levels)	1.881	1.035	0.310
Legibility * Shopping Orientation	0.326	0.179	0.672
Error	1.818		

Hypothesis Four – Not Supported

> *H4: The motivational shopping orientation of a consumer moderates the effect of arousal on pleasantness such that: There is a positive relationship between arousal and pleasantness perceived by a consumer with a hedonic motivational orientation. There is a negative relationship between arousal and pleasantness perceived by a consumer with a utilitarian motivational orientation.*

Again, as in Kaltechva and Weitz's (2006) study, an ANOVA with a 2x2 between-subjects design was used to test the moderating properties of shopping orientation for the affective path. Motivational orientation (task/recreational) and arousal (low/high) were used as fixed factors (independent variables), whereas pleasantness was used as a dependent measure. The statistical testing (see Table 5.8) yielded that shopping orientation is not a significant moderator between the arousal generated through a store environment on the pleasantness of the environment. The interaction term between arousal and shopping orientation was not significant ($F(1, 319) = 0.09$, $p = 0.77$). There was no significant positive relationship between the arousal and pleasantness of a store environment perceived by hedonic consumers, and there was no significant negative relationship between the level of arousal and pleasantness of a store environment perceived by utilitarian consumers.

In addition, since the primes (shelf height, aisle width, floor pattern) had no significance effect on arousal, all subsequent hypotheses of the affective path, such as the mediation hypothesis, have to be rejected. Thus, hypothesis four was rejected.

Table 5.8 Results of the ANOVA Analysis for H4

Dependent Variable: Pleasant

Source	Mean Square	F-Value	P-Value
Corrected Model	9.961	6.597	0.000
Intercept	5204.670	3447.202	0.000
Arousal (High/Low Levels)	27.707	18.351	0.000
Shopping Orientation (Hedonic/Utilitarian Levels)	1.809	1.198	0.275
Arousal * Shopping Orientation	0.135	0.090	0.765
Error	1.510		

5.4.3 Mediating Variables

Hypothesis Five – Partial Support

> *H5: Tangible service quality mediates the effect of legibility on repeat patronage intention.*

In this research the mediation of willingness to buy on legibility effects by tangible service quality was examined using a form of regression analysis. In their studies on atmospherics, Baker, Grewal, and Levy (1992) and Kaltechva and Weitz (2006) employed the mediation analysis suggested by Baron and Kenny (1986). Baron and Kenny (1986) used a mediation analysis to test variables that explain the (internal) how of certain (psychological) effects. The authors advanced that the following three regression equations must be significant in order to demonstrate mediation: "First, the independent variable must affect the mediator in the first equation; second, the independent variable must be shown to affect the dependent variable in the second equation; third, the mediator must affect the dependent variable in the third equation" (Baron & Kenny, 1986, p.

1177). Mediation is established when the effect of the mediator is controlled and the relationship between the independent and dependent measure is weakened or eliminated.

Tangible service quality was defined as the variable that mediates the relationship between legibility and repeat patronage intention. Following the Baron and Kenny (1986) procedure, first repeat patronage intention was regressed on legibility; then tangible service quality was regressed on legibility, followed by the regression of repeat patronage intention on legibility and tangible service quality. The results are in line with hypothesis four (a). Legibility had a significant effect on repeat patronage intention ($b=0.16$, $p<0.001$). A significant effect of legibility on tangible service quality was also detected ($b=0.22$, $p<0.001$). However, more crucial in this context was that the effect of legibility on repeat patronage intention ($b=0.05$, $p=0.21$) was eliminated when tangible service quality became part of the model (see Table 5.9). These findings allow the hypothesis five to be supported, suggesting total mediation.

Table 5.9 Results of the Mediation Analysis for H5

Dependent Variable: Repeat Patronage Intention

Model		Unstandardized Coefficients		Standardized Coefficients	t-Value	P-Value
		B-Value	Std. Error	Beta		
1	(Constant)	3.198	0.210		15.236	0.000
	Legibility	0.161	0.046	0.192	3.488	0.001
2	(Constant)	1.612	0.226		7.117	0.000
	Legibility	0.050	0.040	0.060	1.250	0.212
	Tangible Service Quality	0.513	0.045	0.542	11.282	0.000

5.4.4 Response Variables

Hypothesis Seven – Supported

> *H7: A high level of tangible service quality will result in a higher consumer repeat-patronage-intention when compared to a low level of tangible service quality.*

For the cognitive path, hypothesis seven proposed that a difference exists between tangible service quality and repeat patronage intention; this influence is suggested to be positive in nature. The results displayed in Table 5.10 corroborate the positive effect on the association hypothesized. The medium of tangible service quality split the respondents into two groups, one representing high, the other low tangible service quality perception. ANOVA was employed, whereby tangible service quality was the fixed factor and repeat patronage intention was designated as dependent variables. The results of the ANOVA (Table 5.10) reveal a significant variance model. Looking at the detailed ANOVA findings, the analysis suggests that repeat patronage intention for the high tangible service quality group is much higher than for the low group ($M_{high\ repeat}$ = 4.34 > $M_{low\ repeat}$ = 3.12, $p < 0.001$). In summary, a store environment that provides more tangible service quality induces more intention to return to the store. Based on this outcome hypothesis H7 is supported.

Table 5.10 Results of the ANOVA Analysis for H7

Dependent Variable: Repeat Patronage Intention

Source	Mean Square	F-Value	P-Value
Corrected Model	104.962	76.753	0.000
Intercept	4613.113	3373.314	0.000
Tangible Service Quality (High/Low Levels)	104.962	76.753	0.000
Error	1.368		

Hypothesis Eight – Not Supported

H8: A high level of store environment pleasantness will result in a higher consumer repeat-patronage-intention when compared to a low level of pleasantness.

As in Kaltechva and Weitz's (2006) study, it was expected that the pleasantness of a store environment has a positive impact on repeat patronage intention, which would have been tested with ANOVA. For ANOVA, pleasantness would have served as independent and repeat patronage intention as the dependent variable. Since the primes (shelf height, aisle width, floor pattern) utilized for this research did not generate significant differences between the respective levels for arousal for the affective path, a further investigation of the dependent association proposed in H8 would be unwarranted. Therefore, hypothesis H8 was rejected.

5.5 Results of Hypothesis Testing – Study 2

The goal of Study 2 was to replicate the results obtained in Study 1 by utilizing a different manipulation (priming) technique, and to provide additional insights into the processes that concern themselves with these environment-behaviour relationships; however, in both studies the same manipulations were employed. Study 1 used photographic images of store environments whereas Study 2 utilized virtual shopping environments generated through an off-the-shelf interior design software. Overall, Study 2 provides further support for the findings generated in Study 1, while, at the same time, introducing a new, inexpensive, and controllable way to research the shopping environment.

As far as Study 2 is concerned, the same steps as in Study 1 were undertaken to deal with missing data. Based on the suggestions of Hair et

al. (1998) mean substitution was employed to values not provided by the respondents. Following is Table 5.11 that summarizes the hypotheses used for Study 2, which employed the same hypotheses, independent and dependent measures, and sample size as Study 1.

Table 5.11 Summary of the Hypotheses Framework

Hypothesis	Independent	Dependent	Relationship	Statistical Method
H1(a)	Aisle Width	Legibility	Negative	ANOVA
H1(b)	Shelf Height	Legibility	Positive	ANOVA
H1(c)	Floor Pattern	Legibility	Negative	ANOVA
H2(a)	Aisle Width	Arousal	Positive	ANOVA
H2(b)	Shelf Height	Arousal	Negative	ANOVA
H2(c)	Floor Pattern	Arousal	Positive	ANOVA
H3	Legibility	Tangible Service Qual	Moderation(Ori)	ANOVA
H4	Arousal	Pleasantness	Moderation	ANOVA
H5	Legibility	Repeat Patronage	Mediation(TSQ)	Regression
H6	Pleasantness	Repeat Patronage	Mediation(Plea)	Regression
H7	Tangible Service Qual	Repeat Patronage	Positive	ANOVA
H8	Pleasantness	Repeat Patronage	Positive	ANOVA

Before testing the hypotheses proposed in Chapter 3, the measures were assessed as to their validity and reliability. A sample consisting of 320 students was used. Sixteen conditions with appropriate store virtual environments were created to reflect a 2 (shelf: high vs. low) x 2 (aisle: wide vs. narrow) x 2 (floor pattern: simple vs. complex) x 2 (orientation: hedonic vs. utilitarian) design. One group of 20 subjects was exposed to one condition, creating an in-between the subjects design. Earlier discussed theories and research studies established the content validity of the measures used. To test the reliability of the given measures, Cronbach's alpha was employed (Cronbach, 1951). All scales for the applicable items showed Cronbach's alpha coefficients ranging from 0.67 to 0.92, thus appearing to demonstrate sufficient internal reliability (see

Table 5.12). Nunnally (1978) suggested that the acceptable minimum reliability for research should be 0.7 or greater. This is true for almost all of the measures used in this research (including the two-item shopping orientation measure). In addition, to examining the reliabilities of the scales, exploratory factor analysis was utilized to perform an internal structural analysis for each measure. The variances explained for each factor of each measure ranged from 53% to 82%, the factor loadings ranged from 0.65 to 0.91, and no significant cross-loadings on other factors of a value greater than 0.37 can be reported. Table 5.12 displays the results of the assessment of the measures employed in this research.

Table 5.12: Summary Table for the Assessment of Measures

Measures	No. of Items	Cronbach's Alpha	No. of Factors
Shelf Height	3	0.89	1
Aisle Width	3	0.87	1
Floor Pattern	3	0.67	1
Shopping Orientation	2	0.72	1
Legibility	4	0.88	1
Tangible Service Quality	4	0.79	1
Arousal	5	0.78	1
Pleasantness	4	0.89	1
Repeat Patronage Intention	4	0.92	1

The analysis of variance assumptions that the observations should be at least interval-scaled, independent and randomly taken from the population were within acceptable parameters for the given study. Homogeneity of variance and normality were substantially present as well,

making the data fit for further analysis. For all measures the results for the Levene's test were not significant, indicating that they fulfilled the assumptions of homogeneity of variance. The measures also met the assumption of normality, employing Kolmogorov-Smirnov and graphic inspection procedures. Therefore, analysis of variance was suitable for testing the hypotheses associated with these measures.

As far as the manipulations are concerned, shelf height, aisle width, floor pattern and shopping orientation were utilized as the manipulations. Analysis of variance was used to check the manipulations. As illustrated in Table 5.13, all manipulations were successful and seemed to have been perceived as intended.

Table 5.13: Manipulation Check Results

Manipulation Check Factors	**Mean Values**		**F-Value**	**p-value**
	High	**Low**		
Shelf Height	5.44	2.94	187.71	$p < 0.001$
	Wide	**Narrow**		
Aisle Width	5.47	3.07	233.95	$p < 0.001$
	Simple	**Complex**		
Floor Pattern	4.73	3.85	36.26	$p < 0.001$
	Hedonic	**Utilitarian**		
Shopping Orientation	3.85	2.81	54.94	$p < 0.001$

5.5.1 Independent Variables

Hypothesis One (a), (c) – Supported, Hypothesis One (b) – Not Supported

H1(a): A store environment with low shelves will result in a higher level of legibility than a store environment with high shelves.

H1(b): A store environment with wide aisles will result in a higher level of legibility than a store environment with narrow aisles.

H1(c): A store environment with a simple floor pattern will result in a higher level of legibility than a store environment with a complex floor pattern.

The hypotheses one (a) to (c) relate to the cognitive path of the model proposed in this research. These hypotheses examined whether shelf height/aisle width/floor pattern have an impact on legibility. In this context, similar conditions had been tested during the manipulation check of shelf height (high/low), aisle width (narrow/wide) and floor pattern (simple/complex). Analyses of variance (ANOVA) were undertaken to test the proposed differences (Table 5.14). The ANOVA for hypothesis one (a) demonstrated that the mean legibility for high-shelf store environments is significantly less than the mean legibility for low-shelf environments ($M_{\text{high height}} = 4.10 < M_{\text{low height}} = 4.84$, $p < 0.001$). Hypothesis one (a) was supported. The one-way ANOVA for hypothesis one (b) yielded that the mean legibility for wide-aisle environments is not significantly higher than the mean legibility for narrow-aisle environments ($M_{\text{wide aisle}} = 4.62 > M_{\text{narrow aisle}} = 4.31$, $p < 0.052$). This result did not support hypothesis one (b). This non-support for H1(b) could be attributed to a number of reasons, which have been discussed in Study 1. The ANOVA for H1(c) confirmed the significant difference suggested in this hypothesis, showing that the mean legibility of simple environments was much higher than the mean legibility of complex environments ($M_{\text{simple pattern}} = 4.92 > M_{\text{complex pattern}} = 4.01$, $p < 0.001$). Thus, hypothesis one (c) was supported.

Table 5.14 Results of the ANOVA Analysis for H1(a)-(c)

(a) Shelf Height

Dependent Variable: Legibility

	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	P-Value
Between Groups	43.328	1	43.328	20.812	0.000
Within Groups	662.031	318	2.082		
Total	705.359	319			

(b) Aisle Width

Dependent Variable: Legibility

	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	P-Value
Between Groups	8.369	1	8.369	3.818	0.052
Within Groups	696.990	318	2.192		
Total	705.359	319			

(c) Floor Pattern

Dependent Variable: Legibility

	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	P-Value
Between Groups	68.219	1	68.219	34.048	0.000
Within Groups	637.140	318	2.004		
Total	705.359	319			

Hypothesis Two (a), (b), (c) - Not Supported

H2(a): A store environment with low shelves will result in a lower level of arousal than a store environment with high shelves.

H2(b): A store environment with wide aisles will result in a lower level of arousal than a store environment with narrow aisles.

H2(c): A store environment with a simple floor pattern will result in a lower level of arousal than a store environment with a complex floor pattern.

For the affective path, one-way ANOVAs were performed to test whether the effects of shelf height/aisle width/floor pattern are statistically significant. The pairwise comparison results in Table 5.15 demonstrated that for stores with low shelves the mean of arousal was not significantly lower than for stores with high shelves ($M_{\text{high height}} = 3.49 > M_{\text{low height}} = 3.36$, $p = 0.263$). The same was true for stores with wide aisles as compared to narrow aisles ($M_{\text{wide aisle}} = 3.35 < M_{\text{narrow aisle}} = 3.51$, $p = 0.213$). . Hypotheses two (a) and (b) were not supported. However, for stores with simple floor patterns as compared to complex floor patterns the means for arousal were significantly different ($M_{\text{simple pattern}} = 3.24 < M_{\text{complex pattern}} = 3.62$, $p = 0.001$). Yet, since the mean values for floor pattern are so close together, the F value (F=10.81) small, and Study 1 clearly demonstrated the non-significance of floor pattern in conjunction with arousal, the suggested difference seems at odds with all the other findings. Therefore, It would be erroneous to simple support hypothesis two (c) without suggesting further research and investigation of the methodology employed. In addition, all subsequent hypotheses of this path (including H6) cannot be supported because a precondition for these hypotheses to be considered is that the primes are effective.

Table 5.15 Results of the ANOVA Analysis for H2(a)-(c)

(a) Shelf Height

Dependent Variable: Arousal

	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	P-Value
Between Groups	1.431	1	1.431	1.258	0.263
Within Groups	361.693	318	1.137		
Total	363.124	319			

(b) Aisle Width

Dependent Variable: Arousal

	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	P-Value
Between Groups	1.770	1	1.770	1.558	0.213
Within Groups	361.354	318	1.136		
Total	363.124	319			

(c) Floor Pattern

Dependent Variable: Arousal

	Sum of Squares	Degrees of Freedom	Mean Square	F-Value	P-Value
Between Groups	11.935	1	11.935	10.807	0.001
Within Groups	351.189	318	1.104		
Total	363.124	319			

5.5.2 Moderating Variables

Hypothesis Three – Not Supported

> *H3: The motivational shopping orientation of a consumer moderates the effect of legibility on tangible service such that: There is a positive relationship between legibility and tangible service quality perceived by a consumer with a utilitarian motivational orientation. There is a negative relationship between legibility and tangible service quality perceived by a consumer with a hedonic motivational orientation.*

Based on Kaltechva and Weitz (2006), an ANOVA with a 2x2 between-subjects design was used to test the moderating properties of shopping motivation. Motivational orientation (task/recreational) and legibility (low/high) were used as fixed factors (independent variables), whereas pleasantness was used as a dependent measure. The median-splitting method was employed to dichotomize legibility (Voorhees and Brady 2005, Evanschitzky and Wunderlich 2006). The results of the 2x2 design show (see Table 5.16) that shopping orientation is not a significant moderator between the legibility generated through a store environment on the tangible service quality of the environment ($F(1, 319) = 0.001$, $p = 0.97$). There is no significant positive relationship between legibility and tangible service quality perceived by a consumer with a utilitarian motivational orientation; neither is there a significant negative relationship between legibility and tangible service quality perceived by a consumer with a hedonic motivational orientation. The hypothesis that was tested with the aforementioned 2x2 ANOVA was not accepted.

Table 5.16 Results of the ANOVA Analysis for H3

Dependent Variable: Tangible Service Quality

Source	Mean Square	F-Value	P-Value
Corrected Model	10.142	6.956	0.000
Intercept	4092.574	2806.972	0.000
Legibility (High/Low Levels)	30.090	20.637	0.000
Shopping Orientation (Hedonic/Utilitarian Levels)	0.001	0.000	0.983
Legibility * Shopping Orientation	0.002	0.001	0.970
Error	1.458		

Hypothesis Four – Not Supported

> *H4: The motivational shopping orientation of a consumer moderates the effect of arousal on pleasantness such that: There is a positive relationship between arousal and pleasantness perceived by a consumer with a hedonic motivational orientation. There is a negative relationship between arousal and pleasantness perceived by a consumer with a utilitarian motivational orientation.*

Utilizing an 2x2 ANOVA, Table 5.17 shows that shopping orientation is not significant moderator between arousal and pleasantness of a store environment ($F(1, 319) = 0.34$, $p = 0.56$), and has no significant main effect on pleasantness. This finding does not support H4 that shopping orientation moderates the relationship between arousal and pleasantness, and subsequently this hypothesis had to be rejected.

Table 5.17 Results of the ANOVA Analysis for H4

Dependent Variable: Pleasant

Source	Mean Square	F-Value	P-Value
Corrected Model	23.668	13.953	0.000
Intercept	4012.549	2365.574	0.000
Arousal (High/Low Levels)	61.889	36.487	0.000
Shopping Orientation (Hedonic/Utilitarian Levels)	2.394	1.412	0.236
Arousal * Shopping Orientation	0.570	0.336	0.563
Error	1.696		

5.5.3 Mediating Variables

Hypothesis Five – Supported

> *H5: Tangible service quality mediates the effect of legibility on repeat patronage intention.*

Employing Baron and Kenny (1986) again (cognitive path), the regression of repeat patronage intention on legibility generated a significant result ($b=0.16$, $p < 0.001$). Also the regression of tangible service quality on legibility produced a significant outcome ($b=0.22$, $p<0.001$). When regressing repeat patronage intention on both legibility and tangible service quality and thus including tangible service quality into the model, the effect of legibility on willingness to buy was significantly reduced ($b=0.03$, $p=0.40$). These results (see Table 5.18) support hypothesis five, which advances that tangible service quality mediates the relationship between legibility and repeat patronage intention.

Table 5.18 Results of the Mediation Analysis for H5

Dependent Variable: Repeat Patronage Intention

Model		Unstandardized Coefficients		Standardized Coefficients	t-Value	P-Value
		B-Value	Std. Error	Beta		
1	(Constant)	2.922	0.217		13.444	0.000
	Legibility	0.159	0.046	0.190	3.449	0.001
2	(Constant)	1.319	0.217		6.084	0.000
	Legibility	0.033	0.039	0.040	0.854	0.394
	Tangible Service Quality	0.595	0.047	0.592	12.776	0.000

5.5.4 Response Variables

Hypothesis Seven - Supported

> *H7: A high level of tangible service quality will result in a higher consumer repeat-patronage-intention when compared to a low level of tangible service quality.*

For the cognitive path, hypothesis seven proposed that a difference exist between tangible service quality and repeat patronage intention, respectively. The mean of tangible service quality split the respondents into two groups, one representing the high, the other the low tangible service quality perception. The results of the ANOVA conducted (Table 5.19) revealed a significant variance model. The detailed ANOVA findings suggest that repeat patronage intention for the high tangible service quality group is much higher than for the low group ($M_{\text{high repeat}} = 4.24 > M_{\text{low repeat}} = 3.02$, $p < 0.001$). In summary, a store environment that provides more tangible service quality induces more intention to repatronise the store. Based on this outcome, hypothesis seven is supported.

Table 5.19 Results of the ANOVA Analysis for H7

Dependent Variable: Repeat Patronage Intention

Source	Mean Square	F-Value	P-Value
Corrected Model	120.356	101.894	0.000
Intercept	4224.961	3576.854	0.000
Tangible Service Quality (High/Low Levels)	120.356	101.894	0.000
Error	1.181		

Hypothesis Eight – Not Supported

> *H8: A high level of store environment pleasantness will result in a higher consumer repeat-patronage-intention when compared to a low level of pleasantness.*

As in Kaltechva and Weitz's (2006) study, it was expected that the pleasantness of a store environment has a positive impact on repeat patronage intention, which would have been tested with ANOVA. However, since the primes (shelf height, aisle width, floor pattern) utilised for this research did not produce significant differences for arousal for the affective path, a further investigation of the dependent association proposed in H8 would not be useful. Therefore, hypothesis eight is not supported.

To sum up, firstly Chapter 5 outlined the demographic compositions and shopping habits in physical stores of the main-study samples, which used undergraduate and graduate students from different universities. Secondly, the Chapter presented the results of this experimentation effort derived from statistical testing. Following Chapter 5 is Chapter 6, which engages in a general discussion of the results, presents the implications of this research, looks at the limitations, and finishes with the conclusions of this research.

CHAPTER VI
GENERAL DISCUSSION

6.1 Summary

The purpose of this research was to explore the effect of retail design on shopping behaviour, using a cognitive and affective information-processing route. Based on the Kaplan environmental preference framework, the thesis model examined the cognitive path by refining the traditional Kaplan (1987) structure and adding, in part, service quality. The affective path was studied using the approach-avoidance model designed by Mehrabian and Russell (1974) and adopted by Kaltechva and Weitz (2006) in light of motivational shopping orientation. Overall, the retail design cues of shelf height, aisle width, and floor pattern were posited to have an impact on consumers' cognitive and affective environmental evaluations and, thus, whether consumers repeatedly intend to approach a retail establishment.

A 2x2x2x2, between-subjects (factors: shopping orientation, shelf height, aisle width, floor pattern) laboratory experimental design was employed to test the hypotheses developed from the theoretical framework. Dependent measures included legibility, tangible service quality, arousal, pleasantness, and repeat patronage intention. For the cognitive path, the environmental preference combined with the tangible service quality segments of the model were tested. For the affective path, the arousal and pleasantness parts of the model were tested. The research consisted of two similarly designed studies, with Study 2 aiming to replicate the results of Study 1 with a different methodological and more controllable manipulation approach. For Study 1 expert-selected pictures of store environments and for Study 2 home-grade, computer-generated shopping environments were utilised to enable the necessary environmental manipulations and control for external factors.

Following is a general discussion of the results, implications of this research, limitations of this effort, future research opportunities, and conclusions.

6.2 Discussion of Results (Hypothesis Results)

Chapter 5 reported on the results of the hypothesis testing undertaken on the research framework. Some hypotheses in Study 1 were not supported, with similar results obtained in Study 2. The moderation hypothesis in both studies was not supported, whereas the mediation hypotheses was supported, indicating full mediation. Table 6.1 presents an overview of the results generated through hypothesis testing.

Table 6.1 Summary of the Hypothesis Test Results

Hypothesis	Hypothesized Relationships	Results Study 1	Results Study2
H1(a)	A store environment with low shelves will result in a higher level of legibility than a store environment with high shelves.	Accepted	Accepted
H1(b)	A store environment with wide aisles will result in a higher level of legibility than a store environment with narrow aisles.	Rejected	Rejected
H1(c)	A store environment with a simple floor pattern will result in a higher level of legibility than a store environment with a complex floor pattern.	Accepted	Accepted
H2(a)	A store environment with low shelves will result in a lower level of arousal than a store environment with high shelves.	Rejected	Rejected
H2(b)	A store environment with wide aisles will result in a lower level of arousal than a store environment with narrow aisles.	Rejected	Rejected
H2(c)	A store environment with a simple floor pattern will result in a lower level of arousal than a store environment with a complex floor pattern.	Rejected	Accepted (More research needed)
H3	The motivational shopping orientation of a consumer moderates the effect of legibility on tangible service such that: There is a positive relationship between legibility and tangible service quality perceived by a consumer with a utilitarian motivational orientation. There is a negative relationship between legibility and tangible service quality perceived by a consumer with a hedonic motivational orientation.	Rejected	Rejected
H4	The motivational shopping orientation of a consumer moderates the effect of arousal on pleasantness such that: There is a positive relationship between arousal and pleasantness perceived by a consumer with a hedonic motivational orientation.	Rejected	Rejected

	There is a negative relationship between arousal and pleasantness perceived by a consumer with a utilitarian motivational orientation.		
H5	Tangible service quality mediates the effect of legibility on repeat patronage intention.	Accepted	Accepted
H6	The pleasantness of a store environment mediates the effect of arousal on repeat patronage intention.	Rejected	Rejected
H7	A high level of tangible service quality will result in a higher consumer repeat-patronage-intention when compared to a low level of tangible service quality.	Accepted	Accepted
H8	A high level of store environment pleasantness will result in a higher consumer repeat-patronage-intention when compared to a low level of pleasantness.	Rejected	Rejected

The previous section investigated the eight hypotheses that served as important components in constructing and testing the model proposed in Chapter 3. When revisiting the objectives posited in the beginning of this research, objectives one and two aimed to explore whether shelf height, aisle width, and floor pattern have an impact on shopping behaviour, and whether a more complete stimulus taxonomy can be developed, once the effects of the chosen design factors have been tested and studied. The research specifically found that for both studies, the manipulations of shelf height/aisle width/floor pattern were perceived by the respondents as intended. This suggests that photographic images and virtual environments both make for effective manipulations. Furthermore, the studies found for the cognitive path that a store environment with low shelves will result in a higher level of legibility than a store environment with high shelves (Hypothesis one (a)). The same is true for environments with simple floor patterns, as compared to complex floor patterns (Hypothesis one (c)) but not for environments with wide aisles, as compared to narrow aisles

(Hypothesis one (b)). Store atmospherics research (Titus and Everett 1995) has suggested that atmospherics stimuli, such as layout and shelf-height, which organise the environment, can make the shopping space more legible. For the affective path the manipulations did not have the hypothesized effects as advanced in hypotheses two (a) and (b). However, the virtual method yielded a supportive result for hypothesis two (c), which warrants further investigations in future studies. Overall, the condition of shelf height/aisle width/floor pattern did not result in significantly different high or low levels of arousal. Studies (Donovan et al., 1994; Eroglu, Machleit, & Davis 2003; Sherman, Mathur, & Smith, 1997) have found that atmospheric design cues (in relation to affective/emotional processing) have little or no impact on arousal. The thesis' results suggest that (these) retail design cues can have a significant effect on cognitive but not on affective information process and that especially shelf height and floor pattern should be considered in stimulus taxonomies. In general, objectives one and two were met.

Objective number three was to provide new research evidence for whether shopping orientation moderates the effects of arousal on pleasantness. For Study 1 and Study 2, the motivational shopping orientation of a consumer did not moderate the effect of the arousal generated through a store environment on the pleasantness of the environment on the affective path (Hypothesis four). Thus, there was no significant positive relationship found between the level of arousal and the pleasantness of a store environment perceived by consumers with a hedonic motivational orientation. Neither was there a significant negative relationship detected between the level of arousal and the pleasantness for utilitarian consumers. This is a contrary finding to previous research (Kaltechva & Weitz, 2006), which has shown that motivational orientation moderates the effect of arousal on pleasantness. In addition, shopping orientation did not moderate the effect of legibility on tangible service quality on the cognitive path (Hypothesis three). Thus, objective number three was as not met.

Objective number four examined how tangible service quality impacts the relationship between retail design cues and shopping behaviour. In this context, objective number five asked whether the Kaplan environmental framework can be extended to physical retail environments (with consideration of service quality). Tangible service quality fully mediates the effect of legibility on repeat patronage intention (Hypothesis five). This result provides, in the context of store design cues and environmental preferences, support for the claim that tangible service quality can be an irreducible mediating variable in the relationship between retail design and shopping behaviour. Recent research (Baker, Grewal, & Parasuraman, 1994; Baker et al., 2002) has found that service quality mediates the effect of retail design on purchase behaviour. In addition, the Kaplan framework can be partially extended to physical retail environments. As the results show, objectives number four and five were met.

As far as objectives number one and six are concerned, an attempt was made to ascertain what effect shelf height, aisle width, and floor pattern have on purchase behaviour (repeat patronage intention) and to determine the appropriateness of environmental preferences, service quality theory, and the Mehrabian-Russell approach for the given research. The hypothesized significant difference in mean levels between tangible service quality and repeat patronage intention could be confirmed for the cognitive information-processing route (Hypothesis seven). However, the hypotheses addressing the differences in means between pleasantness and repeat patronage intention was not supported for the affective information-processing route (Hypothesis eight). The same outcomes were exhibited in both studies. Past studies (Baker, Grewal, and Parasuraman, 1994; Baker et al., 2002) have shown that (environmental) evaluations, such as service quality, can impact purchase outcomes on the cognitive but not on the affective path. The environmental preference, service quality, and M-R theories can be deemed appropriate for the research at hand. Given these findings, objectives one and six were met.

To review, not all hypotheses were supported. For both studies, the manipulations of shelf height/aisle width/floor pattern were perceived by the respondents as intended. For the cognitive path the two studies found that a store environment possesses significantly different levels of legibility as related to shelf height and floor pattern (H1(a) and H1(c)). However, for the affective path the manipulations did not have the hypothesized effects as advanced in H2(a) to H2(c); more specifically, the condition of shelf height/aisle width/floor pattern did not result in significantly different high or low levels of arousal. For Study 1 and Study 2, the motivational shopping orientation of a consumer moderated neither the effect of legibility on tangible service quality (cognitive path) nor the effect of arousal on pleasantness (affective path). Yet, tangible service quality fully mediated the effect of legibility on repeat patronage intention on the cognitive route. The hypothesized significant difference in mean levels between tangible service quality and repeat patronage intention could be confirmed for the cognitive information-processing route but failed to materialize between pleasantness and repeat patronage intention (affective route). This leads to the conclusion that in light of the research question (Are the retail design cues of shelf height, aisle width, and floor pattern important determinants of shopping behaviour?), only shelf height and floor pattern are suggested to be effective retail design cues. In turn, these two cues influence consumer repeat patronage intention in a cognitive manner through increased/decreased legibility and tangible service quality.

As the results of both studies suggest, half of the model tested did not work out thus leading to the rejection of eight hypotheses and sub-hypotheses. Following is a discussion of possible reasons why these hypotheses were not supported.

Hypothesis H1b stated that a store environment with wide aisles will result in a higher level of legibility than a store environment with narrow aisles. H1b was not supported by the results. In this case, aisle width could be too closely related to other design features, such as layout, which could have

been perceived to be defined by aisle width and vice versa. Furthermore, the aisle width manipulation might not be strong enough to induce two levels of arousal whose difference (means) is statistically significant; the environmental cue of aisle width seemed to fail to produce strong enough affective (emotional) reactions to be considered a powerful manipulation. Affective processing (emotions) seemed to be more linked to elaborate design features that can stimulate arousal, such as complexity and disorganisation (Donovan and Rossiter, 1982; Kaplan, 1987).

As far as legibility is concerned, affective elaborations are relatively basic associative processes (Berkowitz, 1993). In the scheme of things, legibility is more related to the navigation and comprehension of an environment (O'Neill, 1991; Weisman, 1981), which in turn is related to cognitive processing rather than emotions and feelings that are stimulated by a setting.

The methodological issues seemed to stem from a weak aisle manipulation. In this respect, a pretest (section 4.8) already hinted that aisle width might be a weaker manipulation (insufficient manipulation to create enough legibility) than the primes of shelf height and floor pattern. However, the pretest did not deliver sufficient enough grounds (the Cronbach's alpha and ANOVA results were still within acceptable parameters) to exclude aisle width from the main study. As far as theoretical issues are concerned, no theoretical support could be found. Aisle width has been briefly suggested in atmospheric stimulus taxonomies (Berman & Evans, 1995; Turely & Milliman, 2000) as having an impact on consumer responses. However, to the best of my knowledge, aisle width has never been empirically tested and supported with appropriate theory.

Hypotheses two (a) to (c) (affective path) stated that a store environment with a low shelves/wide aisles/simple floor pattern will result in a lower level of arousal than a store environment with high shelves/narrow aisles/complex floor pattern. The results did not support the hypotheses.

Affective processing (emotions) seemed to be linked to pronounced design features that can stimulate arousal, such as complexity and disorganisation. Berkowitz (1993) defines affective processing as "relatively basic and automatic associative process" (p. 10). Arousal is less related to the navigation and comprehension of an environment (cognitive) and more to emotions and feelings (affective) which are elicited by an environment (Baker et al., 1992; Mehrabian & Russell, 1974).

In addition, the scale was first used by Mehrabian and Russell (1974) and, then, in later years by Kaltechva and Weitz (2006) and was originally conceived for physical environments (three-dimensional environments) and not virtual environments or photographic images (two-dimensional environments).

Study 2 generated an interesting result, with hypothesis two (c) being supported. Yet, since the mean values for floor pattern were close together, the F value small, and Study 1 demonstrated a non-significance of floor pattern in conjunction with arousal, the suggested difference seemed at odds with all the other findings. Further research and a more in-depth investigation of the methodology employed might be able to help open the affective path, which could lead to promising findings as far as arousal, pleasantness, and repeat patronage intention are concerned.

Hypothesis three (and Hypothesis four, respectively) advanced that the motivational shopping orientation of a consumer moderates the effect of legibility on tangible service quality. According to the results, the influence of legibility on tangible service quality does not vary depending on whether a hedonic or utilitarian consumer engages in shopping. The theoretical issue that might contribute to this result is that the scale items suggested by Kaltechva and Weitz (2006) for measuring this model could be improved for future research. The development of additional scale items (supported by appropriate theory) could enhance future research and enable a clearer distinction between the hedonic and the utilitarian condition. In conclusion,

more research is needed to explore the full depth of the properties of shopping orientation in context of retail design.

6.3 Implications

6.3.1 Theoretical Implications

A primary contribution of this study is to provide additional insight into the role atmospherics plays in retailing, in particular, what role environmental cues that relate to design factors play in the retail realm. The results of this thesis support the premise that design cues (shelf height, floor pattern) influence legibility and tangible service quality on the cognitive path but not arousal and pleasantness on the affective path. In turn tangible service quality (cognitive path) affects shopping behaviours, such as repeat patronage intention. Furthermore, this study failed to support the notion that motivational orientation is an effective moderator between legibility and tangible service quality as well as arousal and pleasantness. In addition, tangible service quality has shown to mediate the effect of legibility on repeat patronage intention. These partially successful outcomes illustrate the influence of the design cues on shopping behaviour and are interesting new additions to retailing knowledge and an extension of the existing atmospherics literature. In general, the findings of this research offer the following theoretical implications:

This research supports the notion that parts of the Kaplan framework can be used to evaluate physical retail environments. The research extends elements of the Kaplan (1987) environmental preference framework to regular retail environments and integrates tangible service quality into this structure. This more closely illustrates how shoppers make sense of information provided by a retail setting and explore shopping environments; more specifically, how consumers scan and understand shopping environments in terms of legibility and then make their service quality

determinations about the shopping environment. The more legible an environment is the more service quality it provides to consumers.

Furthermore, this research allows to *create a more complete taxonomy for design stimuli*. With this research, atmospherics could get a step closer to creating a more complete stimulus taxonomy for retail design factors. Thinking beyond Berman and Evans' (1995) and Turley and Milliman's (2000) classification schemes, shelf height and floor pattern are indeed influential stimuli. Mehrabian and Russell (1974), Donovan and Rossiter (1982), and Baker, Grewal, and Levy (1992) sent an important signal in retailing by supporting the notion that there should be "an increasing concern with the effects of architecture and interior design on individual and social behavior" (Mehrabian and Russell 1974, p. 4). One other noted opportunity is that these stimuli could help develop online atmospheric taxonomies (Erolgu, Machleit & Davis, 2001). Thus, in the future, shelf height and floor pattern should be factors that are considered in studies of similar nature and in more atmospheric stimulus taxonomies.

Results present the moderating properties of shopping orientation and mediating properties of tangible service quality. Kaltechva and Weitz (2006) suggested in their study that shopping orientation moderates the effect of arousal on pleasantness on the affective path. However, with the proposed retail-design model, it has been shown that shopping orientation moderates neither the effect of legibility on tangible service quality on the cognitive path nor the effect of arousal on pleasantness on the affective path. Yet, on the cognitive path tangible service quality mediates the effect of legibility on repeat patronage intention. These findings could provide opportunities for future research.

This study introduces new (improved) theory to the field of atmospherics. Turley and Milliman (2000) call for employing "new theory that would explain how consumers process the entire atmosphere" (p. 208). This research helps to introduce more useful theory to brick-and-mortar

atmospherics, such as more detailed service quality theory and a more evolved framework for environmental preferences. (By inserting proven environmental psychology theory into the atmospheric context, new opportunities could arise for traditional theory to be tested in a new frame). Also, the constructs of shelf height and floor pattern were placed into a new context of investigation; they were applied to environmental preferences. In addition, the theoretical structure of this study could be extended beyond the mere design elements to include social and ambient factors to create a more holistic understanding of why atmospherics influences shopping behaviour.

The research in this context is timeless. The studies contribute to the retail theory due to their timelessness. The results are important theoretically in part due to the currency of this subject. Research (Brynes, 2000; Turley & Milliman, 2002) reports that retail design is a major cost factor for retailers. Therefore, the results are significant because new information was made available in one of the most neglected areas of retailing, atmospherics, information which might reduce costs and increase revenue opportunities for retailers.

6.3.2 Methodological Implications

Besides using photographic images, an approach that has been used in previous research (Davis & Ayers, 1975; Hershberger & Cass, 1974; Hu & Jasper, 2006; Hui & Bateson, 1991; Kaplan, 1973, 1987; Machleit et al., 2000), this study employed home-grade, interior design software to enable the required manipulations. "Computer aided design (CAD) is a relatively new method of exploring environmental design that shows great promise for future research as computer software becomes more readily available. Researchers can maintain the realistic strength of the videotapes, yet the experimental manipulations can be achieved with greater ease" (Baker, Grewal, & Levy, 1992, p. 457). Computer technology has progressed so far over the last few years that this approach embedded in a well-structured

methodological framework can be a powerful tool to conduct research on shopping environments and can be enjoyed with the following methodological benefits:

The flexibility of the methodological design was demonstrated. The programme allows the user to choose from a preconceived set of floor plans. Once the dimensions of the building are defined, the programme provides different elements that address the spatial design of the interior, placement of furniture, colour treatment, and lighting. All these elements are already in place and come in different shapes and sizes. The only chore of the user is to select and drag-and-drop his or her choice to the intended location in the design. This degree of flexibility offers the user the freedom to produce a custom design geared towards his or her specific needs.

Resulting from the advantage discussed in the previous paragraph is the, for researchers so vital, design feature of *environmental controllability* of independent variables (shelf height, aisle width, floor pattern). Experimental research that makes use of such an independent feature is maybe, due to its very nature, one of the most convenient to control research designs among all the scientific methodologies, and even more so when computer technology becomes part of the equation. The interior design software adds to some of this convenience by creating an environment that can be easily changed or manipulated. Furthermore, existing blueprints not provided by the programme as well as design components, such as wall treatments, colours, and certain kinds of objects, can be imported and provide the user with a high degree of design control.

Next to controlling the environment, researchers want to be able to *isolate or combine the variables* they measure. With this research technique (software) it is not only possible to isolate particular variables in a simple manner, but also to combine measures and study their coalescent impact.

To study these elements the environment can be designed as stark or as involving as one desires.

Due to the small number of functional buttons incorporated in the task and menu bars and design components (e.g., furniture, colours) that are readily available, this software/method is truly *easy to use*. In addition, the interior design software follows a logical and incremental presentation of the production stages that are employed to generate an efficient design. Together, these advantages allow for a speedy and simplistic design process often needed in an academic research environment burdened by time and monetary constraints.

Another avenue for future research might be the difficulties this study experienced in conjunction with the *measurement of its variables*. Future endeavours could attempt to find more reliable measures than aisle width or shopping orientation when research on atmospherics is undertaken. As measurement technologies become more and more advanced and consumers more and more sophisticated, the Mehrabian-Russell scales and their derivatives will eventually become obsolete. Improved scales could more accurately reflect the effect of store design and shopping orientation on consumer behaviour.

The future of this methodology can be seen as *total experience and control*, as a form of experimentation providing total involvement. Going beyond the importing of real-life images into these virtual environments, in a few years researchers will be able to fully immerse the subjects into the computer generated shopping world. With goggles on their heads and sensors on their fingertips, the subjects will be able to walk through virtual stores, pick the products they want, and interact with other customers. Still cost-prohibitive, once this total experience is realised, the researchers will have a great degree of control over the experiment.

A study by Kaltechva and Weitz (2006), which is related to this research, calls for more controllable and generalizable experimentation and reveals that, "although [our study] creates an experience similar to the experience that consumers have when shopping on the Internet, [it] does not capture many elements of the experience that shoppers have when shopping in a [virtual] store" (p.115). The computer-generated methodology employed in this study could be used as a *hybrid methodological* approach, which marries the control and accessibility features of Internet platforms with the involving and realistic characteristics of physical store environments.

6.3.3 Managerial Implications

In the beginning the research question posed concerned itself with whether the retail design cues of shelf height, aisle width, and floor pattern are important determinants of shopping behaviour? This thesis found that retail design cues that are related to shelf height and floor pattern have a significant impact on shopping behaviour. It is suggested that retail practitioners pay more attention to shelf height and floor pattern features and their elements when designing or redesigning stores. Furthermore, the research at hand produced evidence that tangible service quality is an effective mediator between legibility and repeat patronage intention on the cognitive path, which shows that practitioners should more attentively consider the service retail design provides. All this allows marketers to benefit from the following managerial research characteristics the framework used has to offer.

What can be applied to interior design research might be also useful for *exterior design* research. Architectural features, design functionality, and retail location are only a few of the items that are in desperate need of more research. This research would add significantly to our understanding of consumers and their behaviour. This new exterior dimension could make use of the existing knowledge already provided by architecture and

environmental psychology, and yet it could be a completely new line of research.

The results of this thesis point to *retail design opportunities* which indicate that the level of perceived legibility retailers create with interior design elements does not significantly vary between shoppers with different shopping motivations (hedonic or utilitarian). Thus, a store should not purposely create an illegible (confusing) shopping environment since both hedonic and utilitarian shoppers alike favour legibility. This can be accomplished by creating stores with a simple floor pattern and low shelves, which in turn might also improve the level of security and theft-prevention in a store.

Segmentation has been one of the areas grossly neglected by academics and practitioners while studying atmospherics. Yalch and Spangenberg (1988, 1993) have shown in their studies that consumers of different ages and genders react differently to music cues. The study by Gulas and Schewe (1994) supported the age-related findings generated by Yalch and Spangenberg.

Even though this study focuses on brick-and-mortar store characteristics due to its operationalization through photographic images and virtual environments, the study could also provide some *helpful tips for online stores*. Since physical and online stores are similar in nature (Childers et al., 2001), the design cues (e.g., shelf height, floor pattern) used might be important for both kinds of store. Even though the physical version of a store is more dependent on the design cues in respect to layout/floor pattern than the online version, store layout/floor pattern should not be underestimated as to its influence in online shops. Physical and online shops seemed to be fairly similar as far as the consumer responses to certain design cues are concerned (Fiore, Jin, & Kim, 2005; Griffith, Krampf, & Palmer, 2001; Koufaris et al., 2001/2002; Lohse & Spiller, 1999;

Wu 1999). Therefore, online shopping providers should consider how to include the aforementioned cues into their store planning.

This research also presents as one of its major benefits *methodological feasibility.* The software used for this research endeavour is an inexpensive, accessible means to conduct rigorous research on the shopping environment. This powerful methodology is a quite sophisticated research tool; and yet, it is within the reach of the ordinary retail practitioner. With this approach it is possible to create computer-generated store environments that are flexible, involving, and within the control of the retail manager. The results of this thesis research demonstrate the effectiveness of this technique as a powerful new tool to help study the impact of store design elements on consumer behaviour.

6.4 Limitations

The following are some procedure-related limitations that were taken into consideration during the literature review, statistical testing, and data analysis:

1. *Sampling procedure*. The sampling procedure associated with this research and experimental design, in general, might be a weakness. Convenience (purposive) sampling is not the most refined and precise sampling approach available. However, the judgement of an expert (or expert studies) and respondent selection with a specific purpose in mind seemed to fit well with the given research setup. Due to the limited research in this area, the lack of conceptual precision, the high research cost, and the considerable operational (methodological) investment, the chosen approach was deemed to be sufficient for the study at hand.
2. *Reliability (Replicability).* Although the reliability level for this study was relatively high, there is still room for improvement. Perhaps by selecting better researched constructs within the retail design realm

(e.g., sound, social crowding, sales) the results might have been improved. In addition, more clearly defined constructs might have helped to increase the reliability values (alpha values). Furthermore, more precise measures (scales) might have allowed the collection of more detailed information.

3. *Validity (Measurability).* More importance has to be assigned to validity than reliability since reliability is not in itself sufficient. Due to controllability and flexibility, reliability is not so much of a concern in experimental design; however, internal and external validity are. Malhorta and Birks (2007) stress that experimentation research has the following two objectives: "(1) To draw valid conclusions about the effects of independent variables on the study group [internal validity], and (2) to make valid generalizations to a larger population [external validity]" (p. 307). Whereas experiments usually possess a respectable degree of internal validity (Churchill, 1995), external validity is somewhat a problem. Since laboratory settings create unnatural situations, it is often not easy to make generalisations about the real world (Bell et al., 1996).
4. *Generalizability.* Another constraint of laboratory experiments is that, despite the controllability (and flexibility) they possess, it is always hard to know whether (in how far) these findings are a relatively accurate representation of the true population.

Besides procedure-related limitations that can arise through sampling constraints and reliability and validity imperfections, there are also those limitations that are associated with the computer-generated approach, which was employed for the Study 2. Some of these constraints are as follows:

1. *Graphic design limitations.* Since the software products used are mostly created for the private user, they fail to provide the same graphic sophistication as AutoCAD and other professional, architectural applications. In addition, even though the software

packages possess design elements similar to their professional counterparts, they lack a certain degree of photo-realism.

2. *Compatibility issues*. Despite the applications' global nature, a number of these off-the-shelf items have to be operated from a CD and require the installation of software readers. These software readers may hamper or disable the operation of other programs. In addition, the software products may use World Wide Web links for certain features, some of which can fully function through high-speed Internet connections only.
3. *Technological obsolescence*. Due to the sizable number of consumer-grade design programs on the market and their speed of development, it is hard to get up-to-date software for an up-to-date computer. This is especially true for the incorporation of new design features into newer, more advanced programme versions, features that could be crucial for experimental methods as far as the treatment-design and the isolation and combination of variables are concerned.
4. *Inappropriateness for Retail Design*. These programs are mostly designed for consumer-grade usage, employing simple environments. Therefore, a number of the elements required for a typical shopping environment are not readily available. For example, there were no retail checkout registers, nor were there industrial elements such as warehouse-style lighting, exposed ventilation equipment or shelving units. Thus, a personal computer had to be used as a checkout register, and regular home furnishings, such as shelves or countertops, had to be used as applicable retail store fixtures.
5. *2D and 3D issues*. Despite the power of pictures and virtual environments, their dimensional nature is still somewhat different. Photographic images are two-dimensional renderings whereas virtual environments are three-dimensional representations of realities (in the given study). Photos are more photo-realistic whereas virtual settings are more involving. Yet, despite these

differences, this research attempted to present the intended manipulations (shelf height, aisle width, floor pattern) accordingly to minimize these graphic discrepancies.

6.5 Future Research

The discipline of atmospherics is a fertile ground for additional research. There are many possibilities which future research efforts could pursue. One of these promising possibilities is to find other (significant) moderators and mediators besides shopping orientation and tangible service quality that effectively vary/facilitate the relationship between the legibility of a store environment and the intended shopping behaviour (e.g., repeat patronage intention) in a store.

Another opportunity which presents itself is to research what impact different environmental cues have in their congruent state—the combined effect of environmental cues (Gulas & Bloch, 1995; MacInnis & Park, 1991; Mitchell, Kahn, & Knasko, 1995; Spangenberg, Crowley, & Henderson, 1996) such as design, social, and ambient factors. However, one must not limit research to the traditional view of pleasant design cues. Alternatively, future research could examine environmental stimuli that irritate consumers and attempt to develop strategies to reduce or eliminate these uncomfortable factors in retail environments. Also, marketing scientists are encouraged to investigate not only what impact unidirectional effects environmental stimuli have on shopping behaviour but also what impact the behaviour has on the environment (the bi-directional relationship between environment-behaviour and behaviour-environment).

Future research should attempt to generate additional evidence that shows that the methodological features of flexibility, accessibility, and controllability of a home-grade, interior design software applied are also viable for researching environments other than retail (possible extensions could be manufacturing environments and office workspaces). This

approach could also help to explore the similarities and dissimilarities between physical stores and virtual stores and how the design characteristics of each can be used to their mutual benefit.

Future research efforts could also use this thesis research in conjunction with segmentation and take factors such as age and gender into consideration. Furthermore, it could also investigate what impact geographic or ethnic consumer characteristics have on the atmospherics research at hand.

Study 2 generated an interesting result, with hypothesis two (c) being supported. This suggests a significance of floor pattern in conjunction with arousal. Further research and a more in-depth investigation of the methodology employed might be able to help open the affective path, which could lead to promising findings as far as arousal, pleasantness, and repeat patronage intention are concerned.

However, amidst all these promising future research prospects scientists should not neglect to look into the social and ethical implications of the increasing ability of humans to create shopping environments that influence buyer behaviour and the tools, or lack thereof, that shoppers have to defend themselves against this development.

6.6 Conclusions

The atmospherics framework introduced in this experimentation has indeed generated significant results for both studies used to test the effects of retail design variables on shopping behaviour. With design cues such as shelf-height, aisle width, and floor pattern as stimuli, shopping orientation as an (ineffective) moderator, and tangible service quality as a mediator, this experimental sequence demonstrates that repeat patronage intention is influenced on the cognitive but not affective path. These findings provide new insights into essential areas of consumer behaviour and offer

suggestions for how to effectively design and manage the retail environment.

Based on the Kaplan environmental preference framework, the thesis model examined the cognitive path by refining the traditional Kaplan structure by adding, in part, service quality. The results of this research suggest that shopping orientation does not moderate the effect of legibility on tangible service quality. Yet, the results indicate that tangible service quality fully mediates the effect of legibility on repeat patronage intention. In this respect, this study's research shows that a high level of legibility increases the tangible service quality of the store environment for consumers. However, neither a hedonic nor a utilitarian motivational orientation significantly varies the relationship between legibility and tangible service quality. This warrants the suggestion that retailers could use lower shelves and simpler floor patterns in regard to retail design in order to increase shopping.

The Mehrabian-Russell model as a well-defined framework was applied to show the effects of design stimuli on consumer behaviour on the affective path. However, on the affective path this study failed to demonstrate that shelf-height, aisle width, and floor pattern influence intended consumer responses while moderated by shopping orientation. Shopping orientation did not moderate the effect of arousal on pleasantness and the design cues of shelf-height, aisle width, and floor pattern did not produce significant enough manipulations. In this respect (affective path), whether being a hedonic or utilitarian shopper, spatial arrangements such as shelf-height, aisle width, and floor pattern seemed to be ineffective emotional stimulants which are not producing a significant enough level of arousal in a shopper.

The overarching, unidirectional stimulus-organism-response process used for the research framework has as its outcome an intended behavioural response of a consumer. As this thesis experiment and the previous sequence demonstrated, this intended response made its presence felt on

the cognitive path through a certain level of tangible service quality. The higher the level of tangible service quality provided by a shopping environment, the more likely it is that a consumer is willing to repeatedly return to this environment at later points in time. For one, retailers might not have to pay too much attention to creating either a hedonic or utilitarian shopping experience in a retail-design context. For the other, shelf-height and floor pattern, but not so aisle width, of a store can help them increase/decrease the repeat patronage intention.

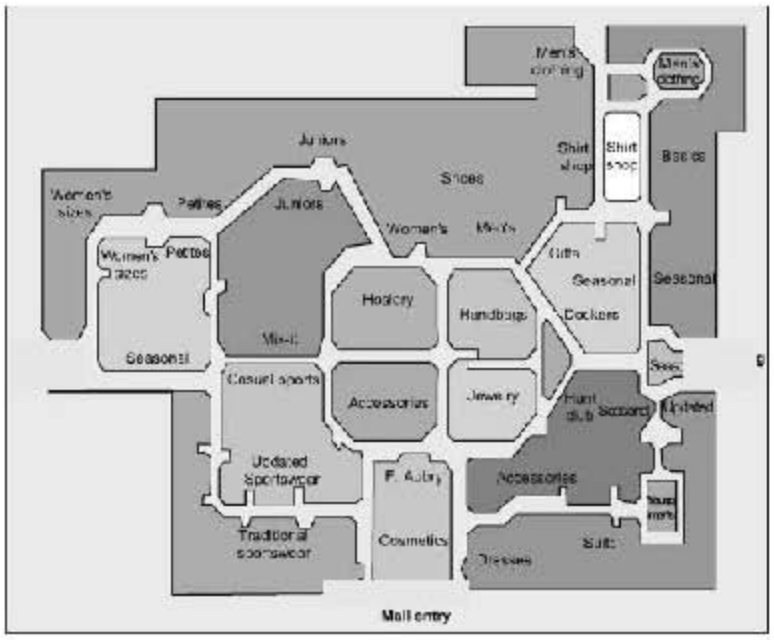
Both photographic images and computer-generated environments can deliver effective manipulations. Whereas photographic images have been successfully employed in previous research, this research points also out the usefulness of an interior design software to aid in the operationalization of this research and enable the necessary manipulations. This finding supports the notion that an inexpensive design software can be employed to conduct rigorous research on the shopping environment. The flexibility, controllability, and accessibility of this technique have proven to be valuable and effective characteristics to create certain conditions, control for variables, and produce valid results. What was once the domain of architects, engineers and professional designers, is now accessible to ordinary researchers and retail practitioners.

When taking all the theoretical, methodological, and managerial contributions of this research into consideration, this thesis has demonstrated that employing environmental-psychological models and (photo and computer-aided) experimentation to do research on retail design is an appropriate and fruitful approach. This research was further encouraged by Mehrabian and Russell's (1974) point that there should be "an increasing concern with the effects of architecture and interior design on individual and social behavior" (Mehrabian & Russell, 1974, p. 4). Overall, intelligent retail design can indeed be a determinant of shopping behaviour.

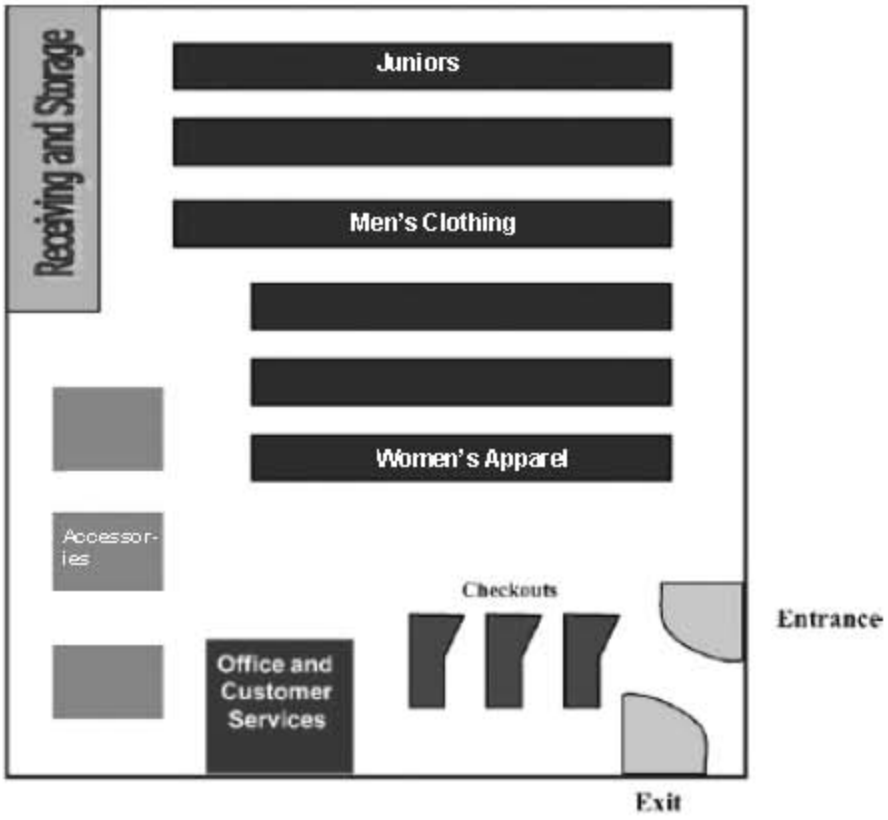
APPENDIX

A1. PHOTOGRAPHIC PRIMES

Floor Pattern: Complex



Floor Pattern: Simple



Source: Adapted from *Retail Management*, by M. Levy & B.A. Weitz, 2001/2007, p. 495. New York: McGraw-Hill/Irwin.

Condition: Low - Wide - Complex

Condition: Low - Narrow - Complex

Condition: Low - Wide - Simple

Condition: Low - Narrow - Simple

Condition: High - Wide - Complex

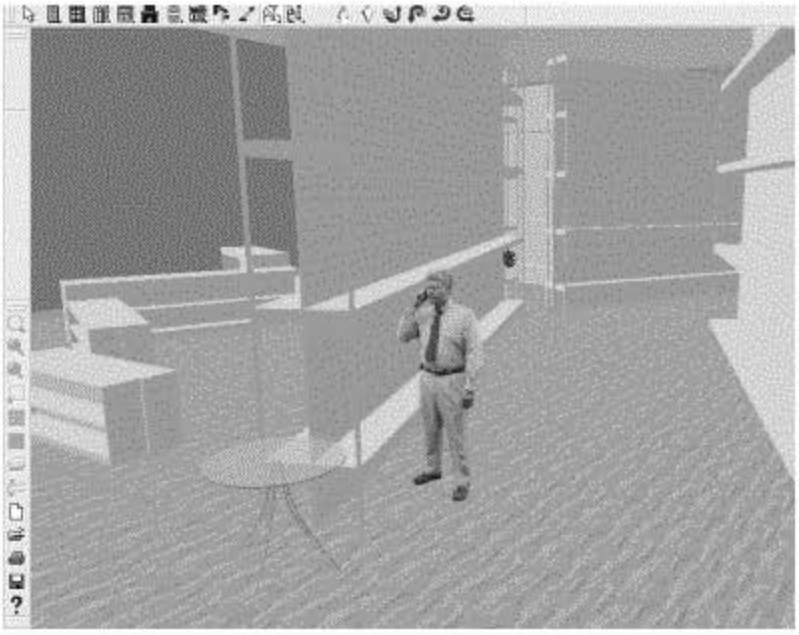
Condition: High - Narrow - Complex

Condition: High - Wide - Simple

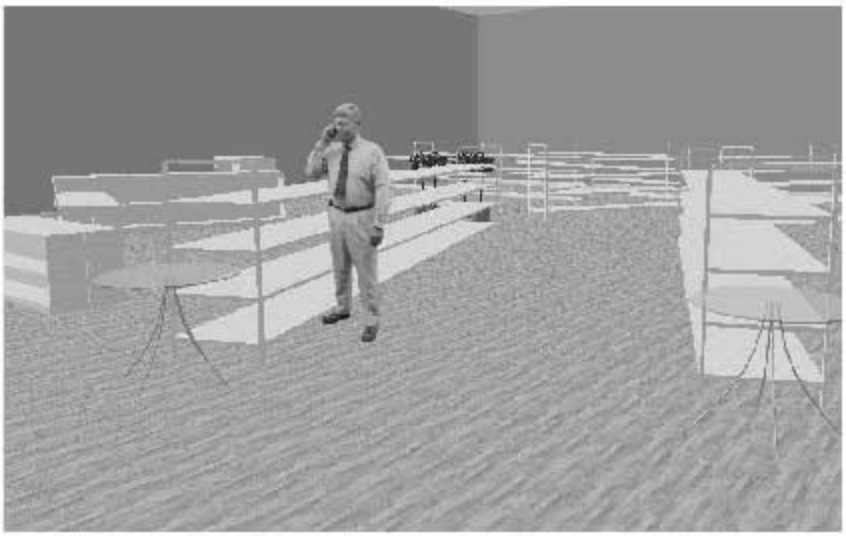
Condition: High - Narrow - Simple

A2. VIRTUAL PRIMES

Condition: High – Wide – Complex



Condition: Low – Wide – Complex



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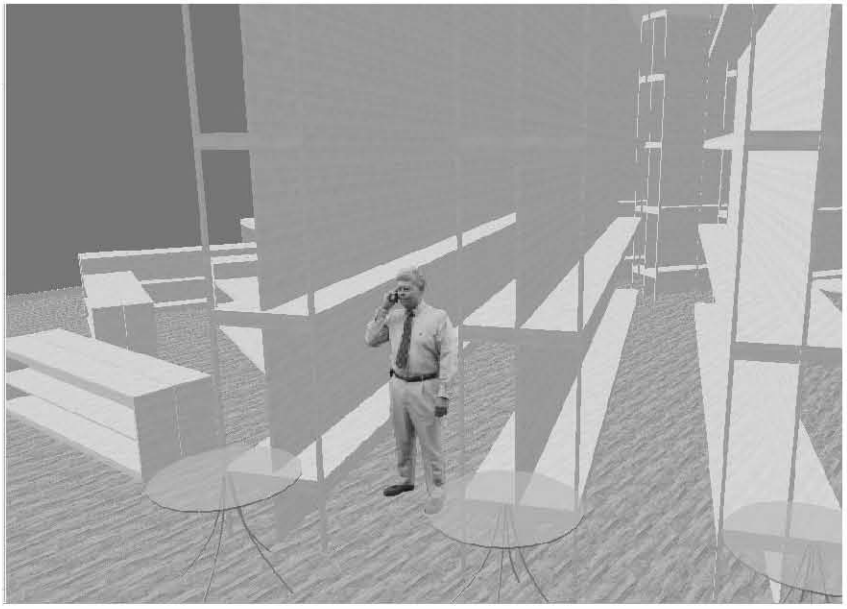
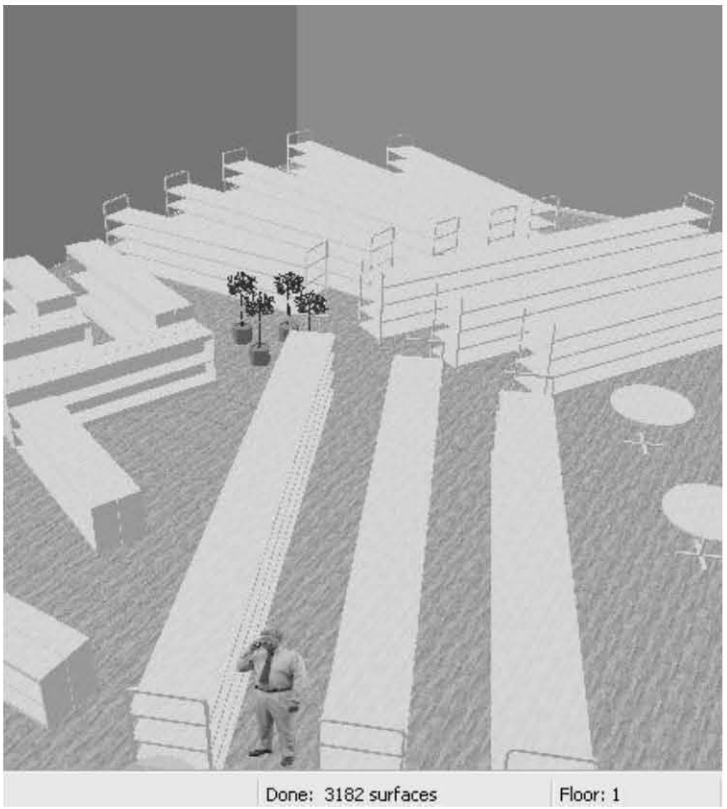
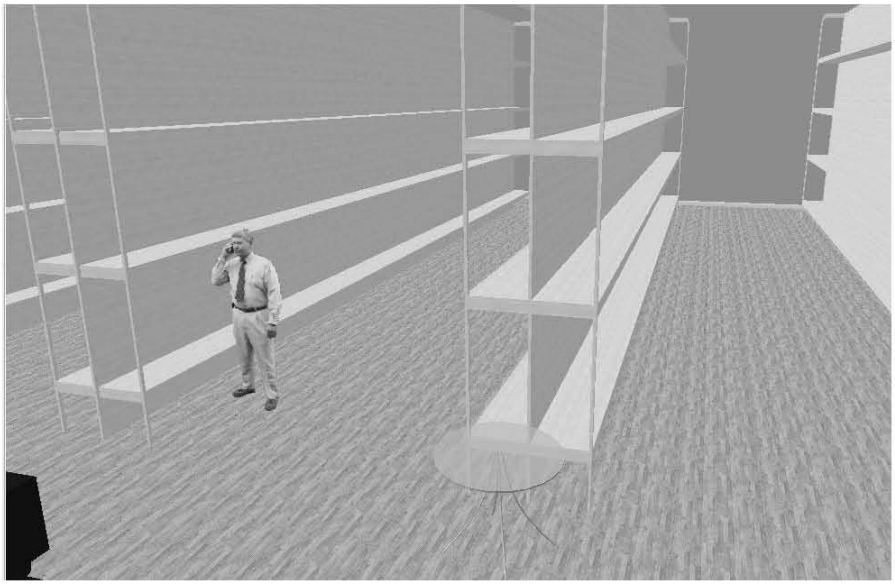


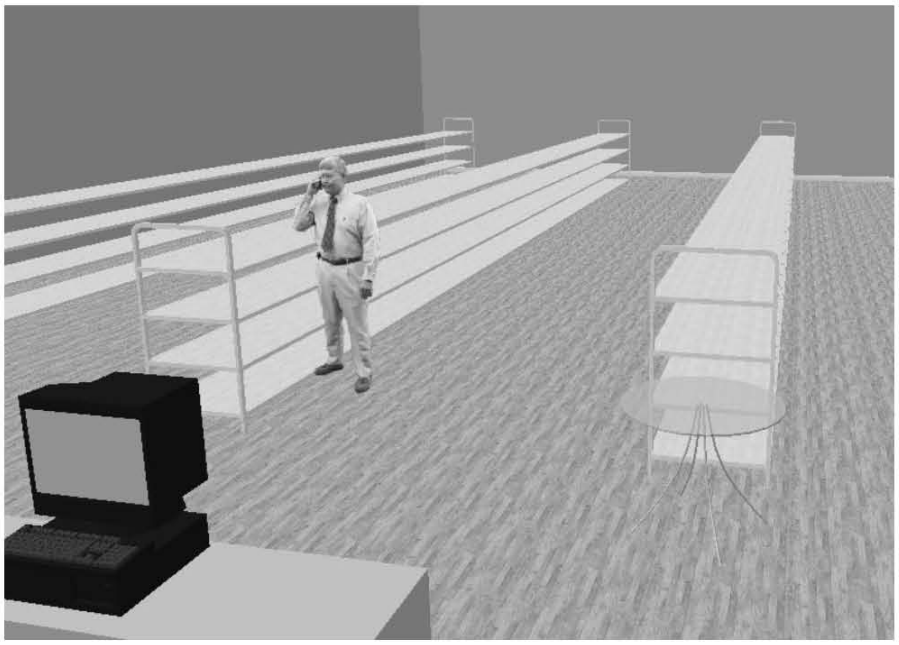
Condition: Low – Narrow – Complex



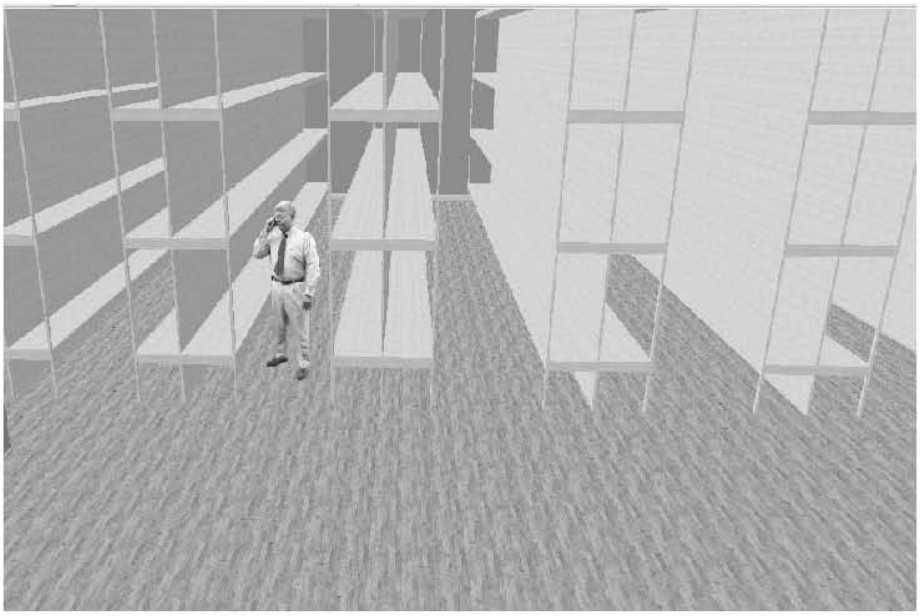
Condition: High – Wide – Simple



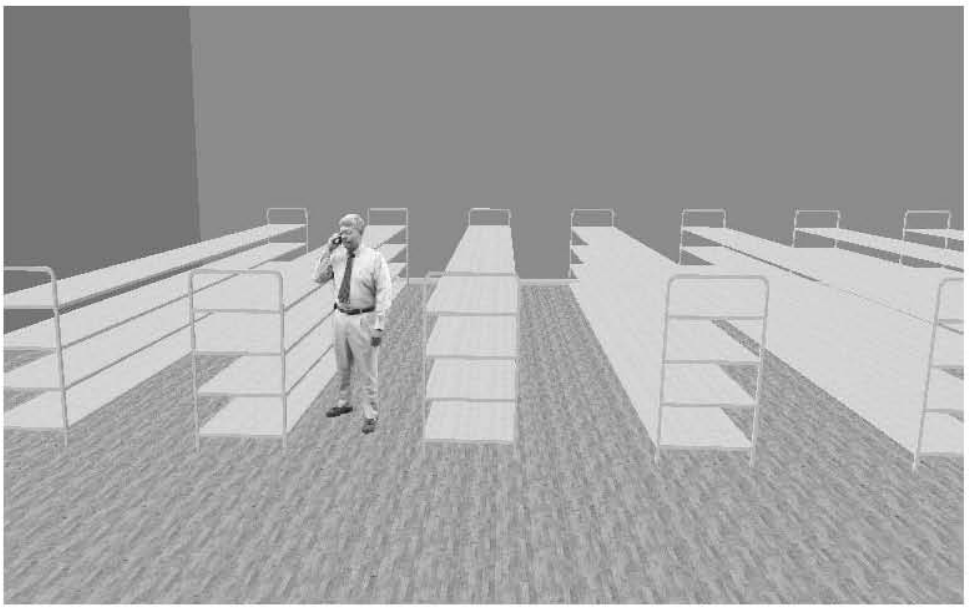
Condition: Low – Wide – Simple



Condition: High – Narrow – Simple



Condition: Low – Narrow – Simple



A3. SHOPPING ORIENTATION PRIMES

Hedonic

"It's just past noon on a Saturday, and none of your friends are around. It's pouring rain, so you can't do anything outdoors. You find what's on TV too dull to watch. You feel very, very bored. You decide to visit a clothing store to relieve the sense of boredom."

Utilitarian

"It's just past noon on a Saturday. You are going on a camping trip tomorrow, Sunday, and you realize that you don't have enough normal, plain T-shirts to wear for the trip. As a result, you decide to purchase at least one more T-shirt. You make your way to a clothing store that sells T-shirts. All you want to do in the clothing store is find one or more normal, plain T-shirts for your trip and leave."

Source: Adapted from "When Should A Retailer Create and Exciting Store Environment," by V. D. Kaltcheva & V. D. Weitz, 2006, *Journal of Marketing*, 70, January, p. 111.

A4. SAMPLE QUESTIONNAIRE (NON-RANDOMIZED VERSION)

DEAR MADAM OR SIR:

Thank you for participating in this survey. The purpose of the survey is to gauge your opinion about a retail environment. First, you will be asked to read a short paragraph and assume the shopping role the paragraph is asking you to take. Then, you will be shown pictures of a store and asked to answer some questions. The survey will take approximately 15 minutes to complete.

Please choose your answers carefully. Your participation in this project is very important and so are your responses to all survey questions. Your responses to the answers will be kept strictly confidential and will be used in aggregate form only.

Instructions:

1) Please read the short paragraph at the beginning of this questionnaire and assume the shopping role the paragraph is asking you to take.

2) Please view the store pictures.

3) After viewing the store pictures, answer the survey questions. Please choose your answers to all parts of the survey carefully.

4) When you have completed the survey, please hand it to the administrator.

Thank you very much for participating in this survey!

In order for us to better understand your answers, please provide us with a little bit of information about your background. Please answer the following questions.

1. You are (Please check the appropriate option): _____Male _____Female
2. Your age is: _____
3. Approximately, how often do you shop in an ordinary (not online) store? (Please check the appropriate option)
   - ___Everyday
   - ___About 5 times a week
   - ___About 3 times a week
   - ___About once a week
   - ___About twice a month
   - ___About once a month
   - ___Never

4. Which of the following would describe your ethnic origin most accurately (OPTIONAL)? (Please check the appropriate option)

___ African American, African, Black
___ Native American, Alaska Native (Tribal affiliation: _____)
___ Asian American (country: _____)
___ Asian, incl. Indian Subcontinent (country: _____)
___ Hispanic, Latino (country: _____)
___Mexican American, Chicano
___Puerto Rican
___Native Hawaiian, Pacific Islander
___White or Caucasian
___ Other (please specify): _____

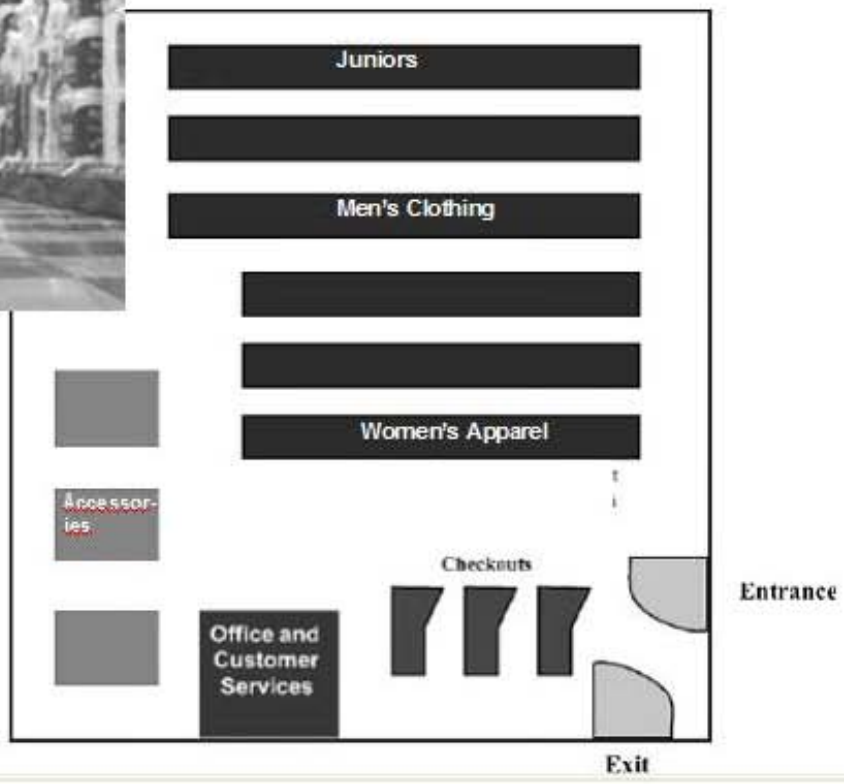
___I would prefer not to supply this information

PLEASE READ THIS PARAGRAPH AND ASSUME THE "SHOPPING ROLE"

"It's just past noon on a Saturday, and none of your friends are around. It's pouring rain, so you can't do anything outdoors. You find what's on TV too dull to watch. You feel very, very bored. You decide to visit a clothing store to relieve the sense of boredom."

Source: Adapted from "When Should A Retailer Create and Exciting Store Environment," by V. D. Kaltcheva & V. D. Weitz, 2006, *Journal of Marketing*, 70, January, p. 111.

THIS IS THE STORE
WHICH YOU VISIT



QUESTIONNAIRE

WHEN YOU ANSWER THE QUESTIONS, PLEASE DO NOT FORGET ABOUT THE SHOPPING ROLE YOU HAVE ASSUMED AND THE STORE WHICH YOU VISIT.

For the following questions, please think about the store environment. Please circle the number (from "1 = Disagree" to "7 = Agree") which best describes your opinion for the following statements about the environment:

	Disagree						Agree
1. To find items in this store would be easy.	1	2	3	4	5	6	7
2. It would be easy to find my way through this store.	1	2	3	4	5	6	7
3. The aisles in this store are laid out in a simple manner.	1	2	3	4	5	6	7
4. This store has wide aisles.	1	2	3	4	5	6	7
5. There is room for two or more shopping carts next to each other in this aisle.	1	2	3	4	5	6	7
6. There is plenty of room between these shelves.	1	2	3	4	5	6	7
7. This store has high shelves.	1	2	3	4	5	6	7
8. It would be hard for most people to get items from the top shelf without a ladder.	1	2	3	4	5	6	7
9. The height of the shelves in this store would block my ability to see the rest of the store.	1	2	3	4	5	6	7

For the following questions, please think about the store environment. Please answer the following questions by placing an "X" on the right line. The more appropriate the adjective, the closer the "X" should be to it.

In this store, I feel:

1. Displeased	___ ___ ___ ___ ___ ___ ___	Pleased
2. Satisfied	___ ___ ___ ___ ___ ___ ___	Dissatisfied
3. Pleasant	___ ___ ___ ___ ___ ___ ___	Unpleasant
4. Unhappy	___ ___ ___ ___ ___ ___ ___	Happy

In this store, I feel:

1. Relaxed	___ ___ ___ ___ ___ ___ ___	Stimulated
2. Excited	___ ___ ___ ___ ___ ___ ___	Calm
3. Frenzied	___ ___ ___ ___ ___ ___ ___	Sluggish
4. Dull	___ ___ ___ ___ ___ ___ ___	Jittery
5. Wide Awake	___ ___ ___ ___ ___ ___ ___	Sleepy
6. Unaroused	___ ___ ___ ___ ___ ___ ___	Aroused

Please answer the following statements by circling the number that describes your answer best.

In this store, I primarily want:

	Disagree						Agree
1. To have fun	1	2	3	4	5	6	7
2. To get things done	1	2	3	4	5	6	7
3. To be task focused	1	2	3	4	5	6	7
4. To relieve boredom	1	2	3	4	5	6	7

Imagine you browse through this store. Please circle the number (from "1 = Disagree" to "7 = Agree") that best describes your opinion for each of the following statements.

	Disagree						Agree
1. I have no trouble finding my way in this store.	1	2	3	4	5	6	7
2. I would be able to direct a shopper who has never been to this store to a certain location (e.g., cash registers, exit) in this store.	1	2	3	4	5	6	7
3. I would be confident of the directions I give to the shopper who has never been to the store.	1	2	3	4	5	6	7
4. In general, I do find this store relatively easy to 'figure out.'	1	2	3	4	5	6	7

For the following statements, please think whether this store environment provides you with a quality service as far as the environment's features are concerned. Please circle the number (from "1 = Disagree" to "7 = Agree") that best describes your opinion for each of the following statements about the environment.

	Disagree						Agree
1. The store has modern-looking equipment and fixtures.	1	2	3	4	5	6	7
2. The physical facilities at this store are visually appealing.	1	2	3	4	5	6	7
3. This store is well designed and appears neat.	1	2	3	4	5	6	7
4. The appearance of the physical facilities of the store is keeping with the type of services provided.	1	2	3	4	5	6	7

Think for a moment about how you would feel to shop at this store again. Then, rate the following items by placing an "X" along the line (___ _X_ ___) to indicate what you think is an appropriate answer.

In the future, my shopping at this store will be:

1. Not at all ___ ___ ___ ___ ___ ___ ___ Very frequent
2. Unlikely ___ ___ ___ ___ ___ ___ ___ Likely
3. Not probable ___ ___ ___ ___ ___ ___ ___ Very probable
4. Impossible ___ ___ ___ ___ ___ ___ ___ Very possible

Thank you very much for participating in this survey!
Please return this survey to the administrator.

A5. SAMPLE PRETEST QUESTIONNAIRE

DEAR MADAM OR SIR:

Thank you for participating in this survey. The purpose of this survey is to gauge your opinion about some retail environments. You will be shown some store pictures and, then, will be asked to answer some questions. The survey will take approximately 10 minutes to complete.

Please choose your answers carefully. Your participation in this project is very important and so are your responses to all survey questions. Your responses to the answers will be kept strictly confidential and will be used in aggregate form only.

Instructions:

1) First, please view the two pictures of the first store.

2) Then, after viewing the first store pictures, answer the survey questions corresponding to these pictures. Please choose your answers to all parts of the survey carefully.

3) Please do this for all four stores.

4) When you have completed the survey, please hand it to the administrator.

Thank you very much for participating in this survey!

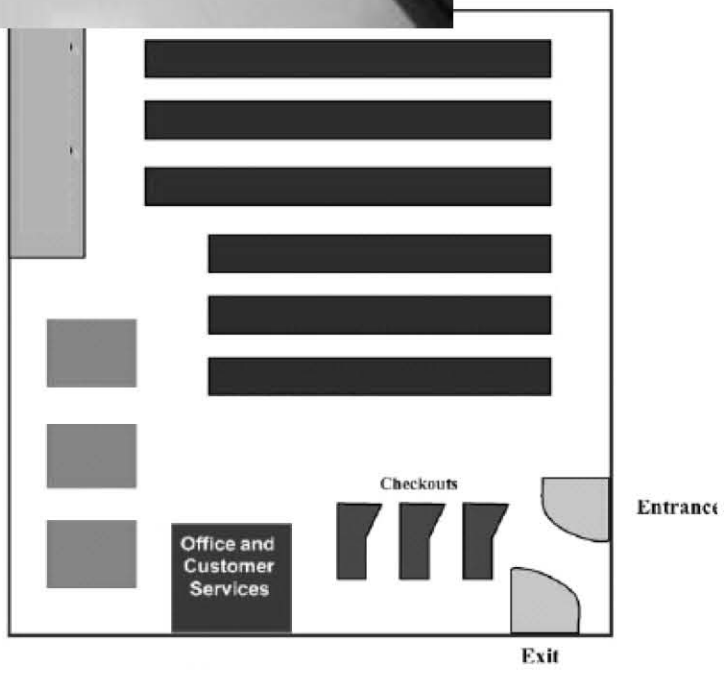
In order for us to better understand your answers, please provide us with a little bit of information about your background. Please answer the following questions.

1. You are (Please tick the appropriate option): _____Male _____Female
2. Your age is: _____
3. Approximately, how often do you shop in a brick-and-mortar (regular) store? (Please tick the appropriate option)

___Everyday
___About 5 times a week
___About 3 times a week
___About once a week
___About twice a month
___About once a month
___Never

4. Which of the following would describe your ethnic origin most accurately? (Please tick the appropriate option)

THIS IS THE STORE
WHICH YOU VISIT



QUESTIONNAIRE FOR THE STORE PICTURES ON THE PREVIOUS PAGE

Imagine you browse through this store. Please circle the number (from "1 = Disagree" to "7 = Agree") that best describes your opinion for each of the following statements.

	Disagree						Agree
1. I have no trouble finding my way in this store.	1	2	3	4	5	6	7
2. I would be able to direct a shopper who has never been to this store to a certain location (e.g., cash registers, exit) in this store.	1	2	3	4	5	6	7
3. I would be confident of the directions I give to the shopper who has never been to the store.	1	2	3	4	5	6	7
4. In general, I do find this store relatively easy to 'figure out.'	1	2	3	4	5	6	7

The following set of statements relate to the experience in the store. Please circle the number (from "1 = Disagree" to "7 = Agree") that best describes your answer to each of the following statements.

	Disagree						Agree
1. The store seems very spacious to me.	1	2	3	4	5	6	7
2. I feel cramped shopping in this store.	1	2	3	4	5	6	7
3. The store has an open feeling to it.	1	2	3	4	5	6	7
4. The store feels confining to shoppers.	1	2	3	4	5	6	7

For the following statements, please think about the elements that are part of this store environment. Please circle the number (from "1 = Disagree" to "7 = Agree") that best describes your opinion for each of the following statements about the environment.

	Disagree						Agree
1. The store has a symmetric layout.	1	2	3	4	5	6	7
2. The store is well organized.	1	2	3	4	5	6	7
3. The layout of the aisles in one section of the store is similar to the other sections of the store.	1	2	3	4	5	6	7
4. From a design perspective, the individual parts of the store hang somehow together.	1	2	3	4	5	6	7

Please circle the number (from "1 = Disagree" to "7 = Agree") that best describes your opinion for each of the following statements.

	Disagree						Agree
1. This store has wide aisles.	1	2	3	4	5	6	7
2. This store has high shelves.	1	2	3	4	5	6	7
3. The aisles in this store are laid out in a simple manner.	1	2	3	4	5	6	7

A6. SCALE PROPERTIES FOR KALTECHVA AND WEITZ (2006) MEASURES

Arousal, Pleasantness and Motivational Orientation Measures

Measure	Scale	Dimension	Result (Sample Studies)
Pleasantness	Scored on a nine-point semantic differential scale	(Study 1) In this store, I would feel: (Study 2) Throughout my visit to the concept music store, I felt: Displeased versus pleased; satisfied versus dissatisfied (reversed); pleasant versus unpleasant (reversed); unhappy versus happy.	Study 1: M = 6.05, SD = 1.70, alpha= 0.856; Study 2: M = 5.70, SD = 1.88, alpha = 0.912; Studies 1 and 2: M = 5.88, SD = 1.80, alpha= 0.887
Arousal	Scored on a nine-point semantic differential scale	(Study 1) In this store, I would feel: (Study 2) Throughout my visit to the concept music store, I felt: Relaxed versus stimulated; excited versus calm (reversed); frenzied versus sluggish (reversed); dull versus jittery; wide awake versus sleepy (reversed); unaroused versus aroused.	Study 1: M = 5.11, SD = 1.23, alpha= 0.784; Study 2: M = 4.92, SD = 1.66, alpha= 0.886; Studies 1 and 2: M = 5.02, SD = 1.46, alpha= 0.848
Motivational Orientation	Scored on a nine-point Likert scale, anchored by "strongly disagree" and "strongly agree"	(Study 1) On this shopping occasion, I would primarily want: (Study 2) In the store, I primarily wanted: To have fun; to get things done (reversed); to be task focused (reversed); to relieve boredom.	Study 1: M = 4.87, SD = 1.91, alpha= 0.850; Study 2: M = 4.70, SD = 1.72, alpha= 0.771; Studies 1 and 2: M = 4.79, SD = 1.82, alpha = 0.808

A7. RUBRIC FOR SOFTWARE SELECTION

Name of the software application: _____

Please choose the appropriate software application and, then, check the boxes that best describes your opinion for the following statements.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Specialist Application (professional architectural software for specialized design project)					
The design elements are flexible when used	❑	❑	❑	❑	❑
It is easy to control the variables researched	❑	❑	❑	❑	❑
It is easy to study measures in isolation or combination	❑	❑	❑	❑	❑
The software is easy to access (e.g., load, update)	❑	❑	❑	❑	❑
The software is expensive	❑	❑	❑	❑	❑
The software would require a big training commitment	❑	❑	❑	❑	❑
Semi-Professional Application (software for professional as well as amateur computer users)					
The design elements are flexible when used	❑	❑	❑	❑	❑
It is easy to control the variables researched	❑	❑	❑	❑	❑
It is easy to study measures in isolation or combination	❑	❑	❑	❑	❑
The software is easy to access (e.g., load, update)	❑	❑	❑	❑	❑
The software is expensive	❑	❑	❑	❑	❑
The software would require a big training commitment	❑	❑	❑	❑	❑
Consumer Application (amateur computer software which is readily available)					
The design elements are flexible when used	❑	❑	❑	❑	❑
It is easy to control the variables researched	❑	❑	❑	❑	❑
It is easy to study measures	❑	❑	❑	❑	❑

in isolation or combination					
The software is easy to access (e.g., load, update)	❑	❑	❑	❑	❑
The software is expensive	❑	❑	❑	❑	❑
The software would require a big training commitment	❑	❑	❑	❑	❑

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